MACHINE FOR SAWING TIMBER UNDER WATER.

Fig. 1.

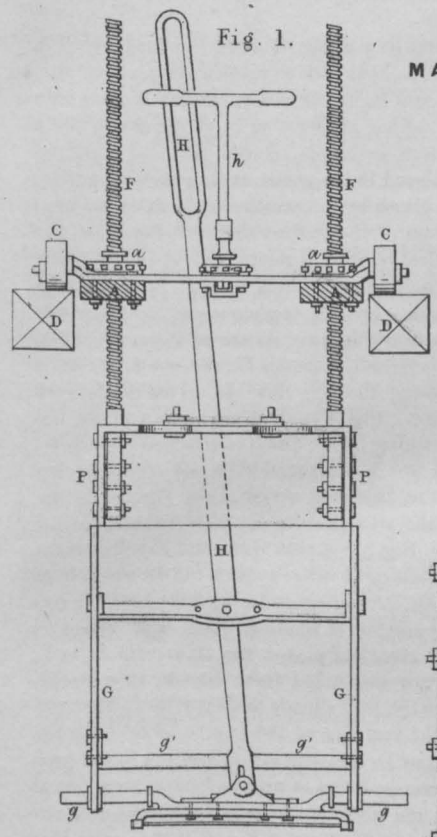


Fig. 3.

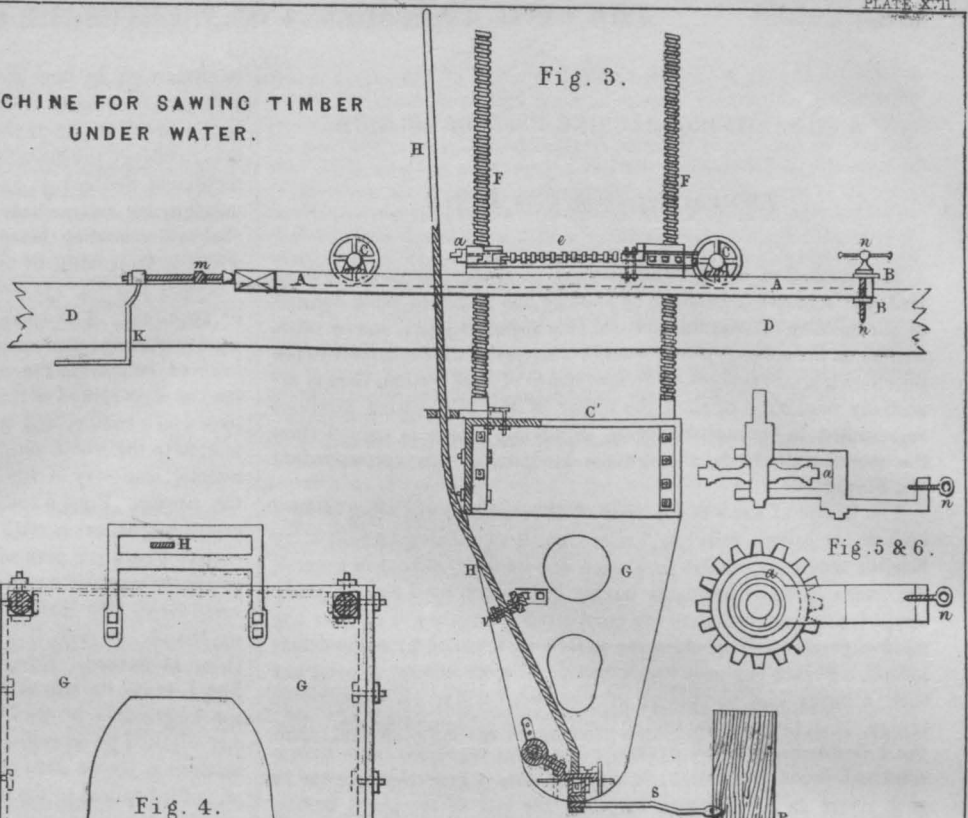
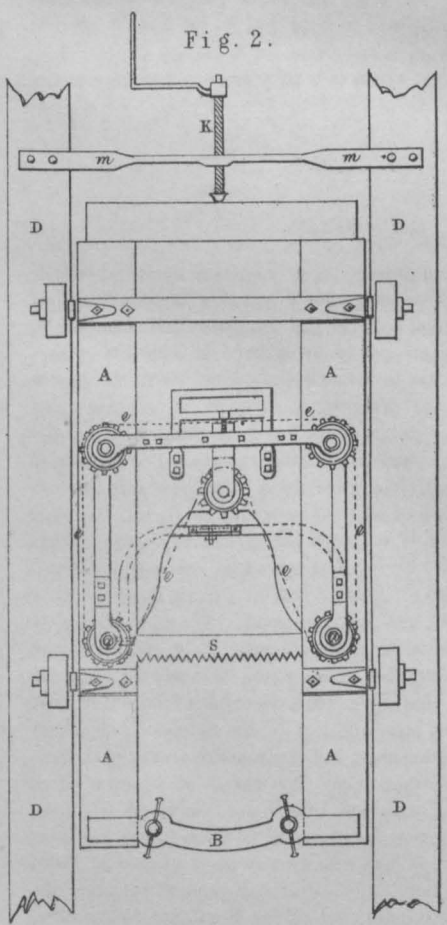


Fig. 5 & 6.

Fig. 4.

Fig. 2.



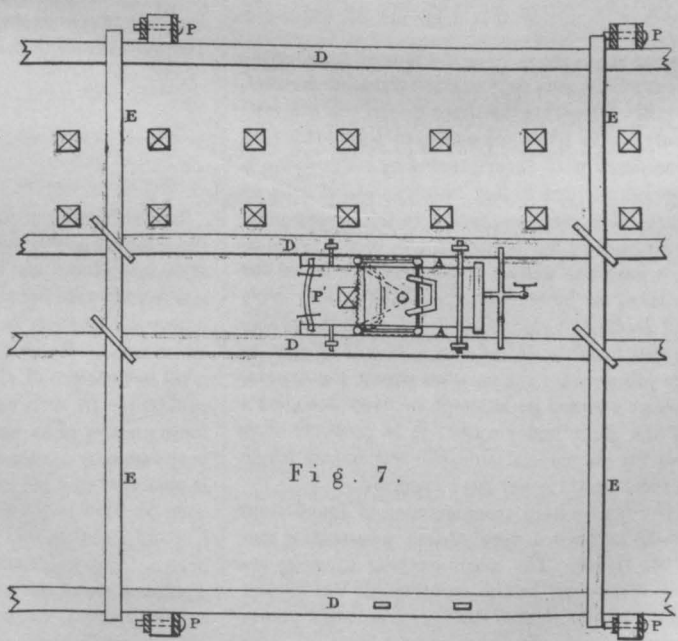


Fig. 7.

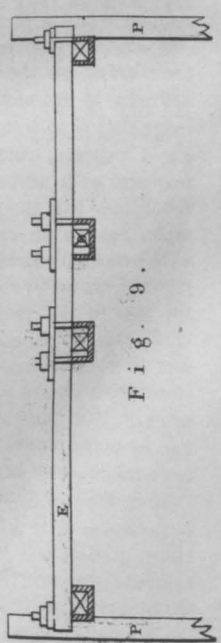


Fig. 9.

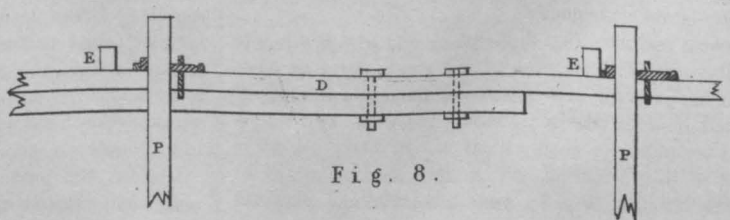


Fig. 8.

J. R. Jobbins, 3, Warwick Ct.

A PILE-CUTTING MACHINE USED IN BELGIUM.

(With an Engraving, Plate XVII.)

THE method of laying foundations of piers by caissons has been so well and minutely described by Labelye and Milne, in their account of the building of Westminster and Blackfriars Bridges, and by other writers on the subject, that it would be useless further to advert to the peculiarities, advantages or disadvantages of that system, than is essentially necessary to show the utility of the pile-cutting machine, represented in the accompanying engraving, which is copied from the working drawings, through the kindness of our correspondent Mr. Flanagan.

The failure of some of the piers of Westminster and other bridges built on the caisson principle, has brought it into disrepute with many English engineers, whilst in France and on the continent in general, the cause of these accidents having been ascertained and a remedy applied, caisson foundations are considered as secure and solid as the more expensive and troublesome system of founding by coffer-dams; indeed, a French engineer would consider it more difficult to construct such a coffer-dam as that at present round a pier of Westminster bridge, than to make the bridge itself on the caisson principle. The great desideratum in all hydraulic structures especially, is to have a solid and sound foundation; in England this is generally obtained in such rivers as the Thames, by piling the site of the piers, having previously surrounded it by a coffer dam, and cutting off the piles quite level close to the bed of the river, laying on them a platform of timber, and the interstices filled in with rubble stone, upon which the pier is raised. Now this can be effected by using the machine exhibited in the plate, without incurring the great expense of constructing a coffer-dam. The piles are driven *au refus*, or as far as possible, without injury to them, at a distance of about three feet apart; they are then cut off quite level by the pile-cutting machine, and on them the caisson is laid with the greatest facility.

Every one who has seen the bridges over the Meuse, the Ourthe, the Vesdre, on the railway between Liège and the Prussian frontier, and who is acquainted with the nature of these rivers, will acknowledge that if such structures could be raised on this principle at a very slight expense, when compared with those erected by coffer-dams, it may also with advantage be adopted in this country; and it must be recollected that the failures of works constructed on the caisson principle, have been caused either by not piling the site of the piers, as at Westminster Bridge, where the action of the stream washed the gravel from under the caisson, or by leaving the piles too long above the bed of the river and placing them too far apart, as at the bridge of Tours. It is curious that Labelye, in his description of Westminster Bridge, recommends piling under the caissons where the foundations are bad, and yet never adopted it, although he even designed a machine for cutting off the piles under water; it is probable that, had he acted according to his recommendation, the settlements which have taken place in the piers would never have occurred.

It is evident that in the system here recommended of foundations by caissons, it is necessary to have a very perfect pile-cutting machine, particularly in deep rivers. The accompanying drawing represents that which has been used in the erecting of Val Beuvit Bridge, and has been used at the Boveni Bridge, now built across the Meuse at Liège; it has been found to answer its purpose very well, and may safely be recommended.

Fig. 1, a transverse section; Fig. 2, the plan; and Fig. 3, a longitudinal section; the same letters refer to the same parts in each figure. This machine consists of a horizontal moveable framing of timber A, supported on four wheels C, which move on two longitudinal beams D D, parallel to each other; one of these beams is moved as each row of piles is cut off, and is fixed by iron straps to moveable transverse beams E, Fig. 7; from this horizontal platform is suspended, by four screws F, passing through "cogged nuts" *a*, a vertical framing of iron, C; about half way down this framing at *r*, is the pivot on which the arm H, of the saw *s*, moves; *g*, are guide bars to change the circular motion of the arm H, of the saw *s*, into a rectilinear motion: *g'*, an iron stay bolt. Round the four "cogged nuts" *a*, and a cog wheel placed in the centre at C, passes an endless chain *e;* on motion being given by the winch handle *h*, to the cog-wheel in the centre, by means of the endless chain passing round the "cogged nuts" *a*, the vertical framing is raised or lowered as it may be required. The small mill-headed screw *n*, Fig. 2, adjusts the tightness of the endless chain. By this ingenious method the saw is lowered equally to the necessary depth. As the platform is shifted, the bar *m*, is spiked to the longitudinal beams D; the screw K, turned by a winch handle, and passing through this bar, gives the forward motion to the whole machine. Fig. 4 is an enlarged view of the horizontal iron stay of the framing G, to which is attached a guide fot the handle. Figs. 5 and 6 are a horizontal view and section of her centre cog-wheel *a*, with the adjusting screw *n*, for tightening the chain. Fig. 7 is a plan of the site, showing the piles and stage upon which the machine travels. Fig. 8 is a side view, and Fig. 9 a transverse view. The other details may be better seen on the drawings than explained. It may, however, be necessary to describe how the machine is worked. Having erected a framing, such as is shown in Fig. 7, round the site of the pier, and placed the transverse balks L, the longitudinal beams D, are suspended from them by iron straps, and adjusted by screws, and the whole made perfectly level, then the machine is placed close to the first pile of the row to be cut; the bar *m*, is then spiked to the beams D, and the saw is lowered to the proper depth, as previously described, and is worked by two men, one at each side of the handle H; the whole machine is kept constantly advancing, by means of the propelling screw K. It is thus seen that three men are required to work the machine, two at the saw and one at the propelling screw.

The machine was designed by the celebrated Belgian engineer, M. Simons. Perhaps it may be well to state that M. De Ridder intends to use the caisson system of foundations for a bridge projected to cross the Meuse at Antwerp, where it is fully as deep and wide as the Thames at London Bridge.

ON STOVES.

SIR—I have been pleased to observe, in your late numbers, two or three letters on the above subject, since I consider it to be one of great importance and interest both to the profession and the public, and one hitherto but little understood by either. It appears to me, however, that there is yet scope for an unprejudiced writer to render asting service to the cause of practical science, by an accurate and lucid comparison of all the stoves which are daily competing for our preference in such endless and perplexing variety. For I imagine there are few of us who will join your three correspondents in their very summary condemnation of *all* the new stoves of the last 10 years. It would be strange, indeed, if so much talent and ingenuity as has been directed to the subject during that period had been wholly fruitless and abortive, and if we really were now in a worse condition than before. But we cannot fall into such an error. We have too lively a recollection of our old "hot air stoves," with their enormous and expensive fires, overheating the chimney and scarcely thawing the air at a yard's resistance, choking us with volumes of burnt air, and requiring almost incessant attention, not to be abundantly thankful for our present efficient, economical, and controulable stoves with their steady heat and automaton regularity. We can all of us now afford to warm our staircases, our halls, our offices, our places of worship; we can be supplied with stoves for rooms of all sizes, from a vestibule to a Chinese museum, and, in fact, nobody now need be cold in doors.

But still, Sir, we want more information, we require to know the merits and demerits of each individual stove. It will not do to consult

the inventors themselves, sanguine men—we have tried that already to our cost. Dr. Arnott, though not as he would have us believe, the first in the field, was the first to get the public ear—taking his advice too readily, we had several explosions, many accidents, and much vexation. Next came Mr. Joyce, and set us all a-gape, but in very little time his stove, too, had to be set aside—Chunk, Vesta, Olmsteed, Solar, and a score more, have been successively tried, and in many instances have caused bitter disappointment. And in connexion with all these, have undoubtedly been many accidental fires, some of a very serious character. In all these cases, possibly, a little more perseverance or a little more information, would have taught us that the fault was not in the stove but in its unsuitable application.

Will you then, Sir, endeavour to induce some clear-sighted practical man to give us such a handbook as shall prevent the repetition of such mistakes, and at the same time bring into notice such stoves as are best suited for each situation. Not only shall we, the public, be benefited thereby, it would prove, I doubt not, a valuable boon to architects, and to the stovemakers themselves.

I am, Sir,

London, Dec. 1843. Your obedient servant,

J. B.

ON THE EFFLUX OF GASEOUS FLUIDS UNDER PRESSURE.

BY CHARLES HOOD, ESQ., F.R.S., F.R.A.S., &c.

Read before the Institution of Civil Engineers.

THE theoretical determination of the velocity with which gaseous fluids are discharged through tubes and apertures under pressure, has often been submitted to mathematical investigation; and the subject being of importance in various branches of practical science, it is to be regretted that considerable differences exist in the results of the several formulæ which have been propounded for its elucidation. Dr. Papin,[1] in 1686, first showed that the efflux of all fluids follows a general law; and that the velocities are inversely as the square roots of the specific gravities. Dr. Gregory[2] has likewise given various formulæ for calculating the velocities of air in motion, under different circumstances; and Mr. Davies Gilbert,[3] Mr. Sylvester,[4] Mr. Tredgold,[5] and many other writers of equal authority, have also investigated the subject.

The hydrodynamic law of spouting fluids has, by all writers, been applied in the calculations for the determination of this question. This law, it is well known, is the same as that of the accelerating velocity of falling bodies; and is proportional to the square root of the height of the superincumbent column of homogeneous fluid. But although the various writers all agree in this fundamental principle, they differ materially in the mode of applying it, and in the several corrections introduced in their theorems; and the results they have arrived at are of a very contradictory character.

Dr. Gregory's formula for calculating the velocity with which air of the natural density will rush into a place containing rarer air, is based upon the velocity with which air flows into a vacuum. This is equal to the velocity a heavy body would acquire by falling freely from a height equal to that which a homogeneous atmosphere would have, whose weight is equal to 30 inches of mercury. The height of this homogeneous atmosphere is 27,818 feet; and the velocity which a body would acquire by falling from this height (and consequently the velocity with which air will flow into a vacuum) is $\sqrt{(27818 \times 64{\cdot}36)} = 1339$ feet per second. The density of the rarefied air, divided by the density of the natural atmosphere, and this number subtracted from unity, represents the force which produces motion; and the square root of this number multiplied by 1339 feet (the velocity with which air rushes into a vacuum) is the velocity with which the atmosphere will rush into any place containing rarer air.[6]

The method employed by Mr. Davies Gilbert is also based upon the velocity with which air rushes into a vacuum, when pressed by a homogeneous atmosphere, equal to the weight of the natural atmosphere at the earth's surface. This supposed homogeneous atmosphere is, according to Mr. Davies Gilbert's calculation, 26058 feet; and the velocity with which air would rush into a vacuum, when pressed by this weight, will be $\sqrt{(26058)} \times 8 = 1295$ feet per second. When this calculation is applied to two columns of air of unequal density—as, for instance, the discharge of air through a chimney shaft—the height of the heated column of air divided by the height of this homogeneous atmosphere, and the square root of this number, multiplied by the velocity with which air flows into a vacuum, and this product again multiplied by the square root of the number representing the expansion of the heated air, will give the velocity in feet per second. The expansion of air when heated is found, (by Mr. Gilbert's method) by raising the decimal 1·002083 (which represents a volume of air expanded by 1° of Fahrenheit) to the power whose index is the number of degrees which the temperature of the air is raised; or it is equal to the fraction $\left(\frac{481}{480}\right)^n$ n being the number of degrees of Fahrenheit, which the temperature of the ascending column exceeds that of the external atmosphere.[7]

Mr. Sylvester's method of calculation proceeds upon the supposition that the respective columns of light and heavy air represent two unequal weights suspended by a cord hanging over a pulley; and this mode of calculation gives a result very much less than by any other method.

The unequal weight of two columns of air is found by Mr. Sylvester nearly in the same manner as by Mr. Gilbert. The volume of air expanded by 1° of heat, is equal to 1·00208: and this number, when raised to the power whose index is the excess of temperature of the heated column, gives the expanded volume of the air; and assuming the atmospheric density to be unity, we have $1 - \frac{1}{(1{\cdot}00208)^e} = d$, e being the excess of temperature of the heated column, and d the difference of density between the two columns. This difference of density, multiplied by 8 times the square root of the height of the tube or shaft containing the heated air, gives the velocity in feet per second.[8]

In Mr. Tredgold's theorem for calculating the efflux of air, the force which produces motion is assumed to be the difference in weight of a column of external and one of internal air, when the bases and heights are the same. The difference of temperature of the two columns by Fahrenheit's scale, divided by the constant number 450 *plus* the temperature of the heated column, and this quotient, multiplied by the height of the tube or shaft, gives the difference in weight. Then by the common theorem for falling bodies, 8 times the square root of this number will give the velocity in feet per second; or accurately, $V = \sqrt{\frac{64\frac{1}{3}\, h\ (t-x)}{450+t}}$, h being the height of the tube, t the temperature of the internal, and x the temperature of the external air.[9]

The method of calculation proposed by Montgolfier, appears, however, by recent experiments, to be the most accurate, as it is also the most simple, of all the modes of determining this question. The difference in height must be ascertained which two columns of air would assume when the one is heated to the given temperature, the other being the temperature of the external air; and the rate of efflux is equal to the velocity that a heavy body would acquire by falling freely through this difference of height.

The space which a gravitating body will pass through in one second we know to be 16·09 feet; but by the principle of accelerating forces, the velocity of a falling body at the end of any given time, is equal to twice the space through which it has passed in that time; or, the velocity is equal to the square root of the height of the fall, multiplied by the square root of 64·36 feet; or, again, to the square root of the number obtained by multiplying 64·36 feet by the height of the fall in feet.

When the *vis viva* is the difference in weight between two columns of air caused by the expansion of one of these columns by heat, the decimal ·00208 which represents the expansion of air by 1° of Fahrenheit must be multiplied by the number of degrees the temperature is raised, and this product again by the height of the heated column. Thus, if the height of the column is 50 feet, and the increase of temperature 20°, we shall have $20 \times {\cdot}00208 \times 50 = 2{\cdot}08$ ft., or 52·08 ft. of hot air will balance 50 ft. of the cold air; and the velocity of efflux of the heated column when pressed by the greater weight

[1] Phil. Transactions, 1686. [2] Gregory's Mechanics, Vol. II, p. 513.
[3] Quarterly Journal of Science, Vol. XIII, p. 113.
[4] Annals of Philosophy, Vol. XIX, p. 408.
[5] Tredgold on Warming Buildings, p. 76.
[6] Gregory's Mechanics, Vol. I, p. 515.
[7] Quarterly Journal of Science, Vol. XIII, p. 113.
[8] Annals of Philosophy, Vol. XIX, p. 408.
[9] Tredgold on Warming Buildings, p. 76.

of the colder column will be equal to $\sqrt{(2{\cdot}08 \times 64)} = 11{\cdot}55$ ft. per second.

The efflux of air under any given pressure can also be calculated by the same means. For the pressure being known, it is only necessary to calculate the height of a column of air which would be equal in weight to this pressure. Thus if the pressure be equal to 1 in. of mercury, water is 827 times the weight of air, and mercury 13·5 times the weight of water; therefore, $827 \times 13{\cdot}5 = 11164$ in. or 930·3 ft.; and according to the preceding formula $\sqrt{(930{\cdot}3 \times 64)} = 244$ ft. per second for the velocity of efflux under this pressure of 1 in. of mercury.

In all these cases the velocity thus ascertained is independent of any loss by friction. A certain deduction must be made for this loss, which will vary greatly according to the nature and size of the tube or shaft through which the air passes as well as with the velocity of the air. Like all other fluids the retardation of the air by friction in passing through straight tubes of any kind, will be *directly* as the length of the tube and the square of the velocity; and *inversely* as the diameter. This question, however, becomes very complicated under these circumstances, and particularly so when there are angular turns in the tubes through which the air passes. The present state of our knowledge on this subject does not allow of any very accurate determination of the amount which ought to be deducted for friction from the initial velocity obtained by calculation; and it is only by empirical means we can arrive at an estimate of its amount.

We shall proceed now to ascertain how far these theoretical calculations agree with the results obtained by experiments.

In some new furnaces which Sir John Guest has lately added to his extensive iron works at Dowlais, some experiments have been made on the quantity of blast injected into the furnaces. In these experiments, the machinery employed being new and of the best construction, the loss occasioned by the escape of air through imperfections of the apparatus, was perhaps as small as possible. The engine for blowing the furnaces made, at the time of the experiments, 18 double strokes per minute. The diameter of the blowing cylinder was 100 inches, and the effective length of the stroke 7 ft. 6 in. From these dimensions, therefore, it appears that 14726 cubic feet of air were taken into the blowing cylinder per minute; and the tubes through which it was discharged from the receiver were six of 4 in. diameter, and six of 1½ in. diameter: the area of all these tubes was therefore ·5747 of a square foot; and the pressure of the blast measured by a mercurial gauge was equal to 4½ inches of mercury. Calculating by the formula already given, we shall have $\sqrt{(827 \times 13{\cdot}58 \times 4{\cdot}5 \div 12 \times 64)} = 519{\cdot}2$ ft., which is the velocity per second; and this number multiplied by 60, and then by the area of the tubes, will give $519{\cdot}2 \times 60 \times {\cdot}5747 = 17903$ cubic feet of air discharged per minute. From this amount some deduction must be made for friction. The velocity of the discharged air is 354 miles per hour; and with this immense velocity, and through such small pipes the friction is no doubt considerable. By deducting 18 per cent from the calculated amount of 17903 cubic feet, we shall have 14681 cubic feet, which agrees within a fraction (namely 45 ft.) with the quantity obtained by measurement.

In other experiments made at the same place, the following were the results. The quantity of air which entered the blowing cylinder was the same as before, namely, 14726 cubic feet: the total area of the tubes which discharged the blast was ·5502 of a square foot, and the pressure of the blast was equal to 4 in. of mercury. The calculation therefore, will be $\sqrt{(827 \times 13{\cdot}58 \times 4 \div 12 \times 64)} = 489{\cdot}5$ ft. per second: and therefore $489{\cdot}5 \times 60 \times {\cdot}5502 = 16159$ cubic feet discharged per minute. The velocity of the blast in this case was 333 miles per hour; and if we deduct for friction 9 per cent from the calculated amount, the remainder is exactly the quantity of air which is ascertained by experiment to be discharged through the tubes.

In a work published in 1834 by M. Dufrenoy, being a report to the Director-General of Mines in France, on the use of the hot blast in the manufacture of iron in England, the results are given of many similar experiments to the above; but with two exceptions the details are not sufficiently ample to found any calculations upon. The two exceptions named are the furnaces at the Clyde and the Butterley iron works, when they were blown with cold air. Both these blowing machines are described as having been in use for several years; and it is therefore natural to suppose the various parts were more worn, and fitted less accurately, than in those experiments already described. The experiments were also made with less care. They show a different result to those already detailed; as in these the calculated quantity of air appears to be less than the quantity which entered the blowing cylinders, in about the same proportion as it exceeded it in the former cases. This difference no doubt arises from the imperfect fitting of the piston of the blowing cylinder, which by allowing a portion of air to escape, would diminish the apparent pressure on the mercurial gauge, placed at the further extremity of the apparatus, and thence the calculated rate of efflux would of course be diminished.

In the experiments at the Clyde works, the quantity of air which was discharged into the furnace when estimated by the quantity that entered the blowing cylinder, was 2827 cubic feet per minute. The pressure of the blast was equal to 6 in. of mercury, and the area of the tubes ·0681 of a cubic foot. Calculating the discharge of air under this pressure, if amounts to 2450 cubic feet, being 13 per cent less than the measured amount, supposing no loss to occur by imperfect fitting of the apparatus.

At the Butterley works the quantity of air discharged into the furnace, estimated by the contents of the cylinder, was 2500 cubic feet per minute. The pressure of the blast was equal to 5 in. of mercury, and the area of the tubes ·0681 of a cubic foot. The quantity by calculation appears to be 2235 cubic feet, being less by 10½ per cent than that shown by experiment. In both these last cases, however, there is but little doubt that the loss of air from the cylinder caused the pressure on the mercurial gauge to be less than it would have been had the apparatus been perfectly tight; and a very small diminution in the observed height of the mercury would account for a much greater difference in the velocity of efflux than is here shown.

We are fully warranted in the conclusion, from these experiments, that this method of calculation is as accurate as any theoretical determination of such question can be; but from the results so obtained an allowance must always be made for friction, which will necessarily vary with the peculiar circumstances of each case.

The following table will exhibit the results of the preceding experiments at one view:—

	Place and No. of Experiment.			
	Dowlais, No. 1.	Dowlais, No. 2.	Clyde, No. 3.	Butterley, No. 4.
Pressure of blast in inches of mercury . .	4·5	4	6	5
Area of tubes (square feet)	·5747	·5502	·0681	·0681
Velocity of blast—miles per hour	354	333	408	372
Quantity of air by experiment (cubic feet) .	14726	14726	2827	2500
Quantity of air by calculation (cubic feet) .	17903	16159	2450	2235
Difference in quantity per cent	+ 18	+ 9	− 13	− 10·5

In order to show the results of the several modes of calculation which different mathematicians have adopted, the following table has been calculated from the data given in experiment Dowlais, No. 2, of the preceding table, and it shows how far the several modes differ from each other in their results:—

Place of experiment, Dowlais.	
Pressure of blast in inches of mercury .. .	4
Area of tubes in square feet	·5502
Quantity of air by experiment, in cubic feet .	14726
Quantity of air discharged (by calculation).	
Montgolfier	16159
Gregory	15152
Gilbert	14855
Sylvester	5017
Tredgold	15555

Considering the amount of friction which must result from the discharge of air at the immense velocity which was obtained in this experiment, namely, 333 miles per hour, and also that some of the tubes were only 1½ in. diameter, it will probably be considered that the highest of these calculations is nearest the truth, as it only allows of a deduction of 9 per cent being made for friction, to reduce the calculated amount to the quantity obtained by experiment. It may therefore be concluded that the method which gives this result, is the most accurate as it is also the most simple for general use.

THE PHILOSOPHY OF OCEANIC FOSSIL FORMATIONS.

CHAPTER IV.

HAVING in the preceding numbers given the Philosophy of Coral Formations and their Architects, we now pass, by a natural transition, to the consideration of fossil bodies as generally diffused through the superficial strata of the earth.

FOSSIL, in Natural History, according to learned commentators of the present day, denotes in general, every thing that is dug out of the earth, whether it be *native* thereto, as metals, stones, salts, earths, and other minerals, or extraneous, as the bones of animals and the like; this understanding of the term Fossil is, however, attended with very great inconvenience to the student, who thus finds the two grand divisions of the earth confusedly blended together, without any just reason being assigned for removing the barrier erected by nature; and again, it is highly objectionable as perpetuating error and misconception of natural phenomena. The simple term FOSSIL ought to be exclusively confined to those bodies or fragments of bodies of animals and vegetables, which, from their peculiar disposition and association, have maintained their integrity of form and quality with very slight alterations, and so much so, as to enable the naturalist to identify their species, and consequently the conditions under which they previously existed. The coral rag, sea shells, bones and teeth of fishes, trees or parts of trees, herbaceous plants and fruits, the bones, tusks, horns and other exuviæ of land animals, found in lias, chalk, oolite, and other formations of the northern hemisphere, so long as their elementary constituents remain unchanged, belong to the fossil kingdom; but the silicified and other mineralized bodies, which, although they retain their primary organic configuration, have undergone a complete change in their atomic structure or elementary constituents, ought to bear the designation of secondary fossils, up to that point in which they enter into and become absolutely one with the mineral kingdom; we are therefore compelled to adopt Mr. Parkinson's appellation of *Primary Fossils*, and *Secondary Fossils*, not for the reasons assigned by him, but in order to denote the natural or mineralized state of organic bodies. By many naturalists the term *petrifactions* has been applied indiscriminately to all fossils: but, independently of the term petrifaction being an absurdity as applied to bodies in the act of silicifying or otherwise mineralizing, it conveys erroneous impressions to the mind respecting this class of phenomena; for many organic bodies, as, for instance, the skeletons of lizards, elephants, and other species, some of which are now extinct, are converted into blue lias, the human skeleton found at Guadaloupe is converted into carbonate of lime; others are found variously silicified, or as aluminaries: organic bodies also pass by transition into shell limestone, or in complete decomposition, into various species of marble, or into loams, chalk, calcareous matter, clays and earths: again, wood is silicified as wood opal, bitumenized as coal, or passes by decomposition into earth. The stone of which Westminster Bridge is built, was quarried from one vast fossil formation, and carefully examined, will be found to consist of calcareous matter, sea worms, shell fish, and other lime-secreting species, slightly held together by the common cement of calx; from this cause it soon undergoes disintegration when exposed to excess of moisture; the material of London Bridge is also fossil formation, but its larger shells have passed into nodules of spar, and the siliceous crystalline base fits it well for the purposes to which it is applied.

Fossils are *Ancient*, *Modern*, *Recent*, and *Still Producing*: in contradistinction to modern geology, they are natural or primary earths, from whence all extraneous bodies, such as sands, stones, rocks, salts, and other minerals, derive their existence: they are divisible into oceanic, or those exclusively belonging to sea waters, lacustrine or fresh water, and terrestrial (here used to signify creatures of the dry land); and inasmuch as there are living species peculiar to the earth, and living species peculiar to the waters, so there are also proximate principles and compounds produced by, and proceeding from these species, peculiar to each, as is palpable to all men, both from the nature of the respective fossil beds, and from the nature of the earths produced by the decomposition of these fossils: thus, lime formations, the presence in large masses of sodium and magnesium, of sea shells and other marine exuviæ, denote oceanic formations; vegetable earths, vegetable fossil beds, and fossil bodies in whatever state of change they may appear, are equally true indications of terrestrial action and of terrestrial influences; while beds of mixed qualities denote the combinations of the one with the other. These distinctions, upon which natural philosophy must eventually rest, have hitherto been lost sight of, for although organic beings have been classified according to their respective elements, no right conception has hitherto been formed of the fossil or mineral kingdom, the latter proceeding from or generating under local influences from the former, and consequently the fossil kingdom, in the primary sequence of events, taking precedence of the mineral kingdom.

It must be generally understood, that entire change in configuration or properties of organic bodies is far from being a necessary or invariable consequence of the cessation of life; for as is demonstrated by nature in various parts of the earth, years, ages, nay, revolutions of time may pass away, and still organic bodies remain constant to their original form and qualities; thus, much of the strata of Europe, formed in periods extending far beyond the records of man, consist wholly of peculiar families, uniting and united with the fragments and comminuted particles of other species common to the age, temperature, and element in which they lived and propagated their kind. These extensive fossil formations bear unerring testimony to the gradual development of oceanic, lacustrine, and terrestrial beds, to the laws of force and combination by which they were produced, and to the laws of nature which govern their production: they also speak of the progressive development of life as advocated by many learned writers, of genera branching into orders, and of orders branching into species, as the accidents of climate, association, and conformation may determine. A great portion of oceanic soil is of necessity hidden from our view by reason of the depth of the waters, or from being covered in by terrestrial matters, and another and still larger portion escapes the immediate cognizance of the senses from the changes it has undergone in decomposition and recombination of its parts; but the vast extent of fossil beds, and their general diffusion in and throughout the superficial strata, are the enduring memorials that such things were, and that to them this planetary body we inhabit is indebted for its present form, composition, and character: to the relics of these once living generations we must, therefore, look for explanation of the causes of effects manifest in the varied phenomena of creation, destruction, and re-production. As in life and throughout the great chain of existence, the living are subservient to the living, so do we find all, the living and the dead, subservient to the great end of nature, the increase of consolidated matter, and the ultimate maturity of the earth.

The transition from life to death is natural; of the numerous compounds elaborated by living species, nothing is lost; portions thereof may return to the elements from whence they were abstracted, but the bulk of the body remains as the building material in the hands of nature, with which the edifice of beauty is built: thus the matters of which the various beds of the earth is composed, whether in comminuted particles or in fossil or mineral forms, boast of one common parentage, and become in the end subservient to the one common purpose. It is, indeed, singularly beautiful to observe the countless changes, and modifications of change, the capacities, powers, attributes, quantities and qualities, proceeding from the one common fountain, LIFE—still increasing in its quantities, and in its varieties as it rolls onward in the trackless paths of eternity, increasing in its qualities and powers by multiplication of qualities and powers, its end being lost sight of in the fathomless regions of space.

The earth we inhabit, so far as the discoveries of man extend, consists of innumerable beds horizontally, vertically, or otherwise disposed, being sometimes of homogeneous and at other times of mixed qualities, and divisible into *the living*, *the fossil*, and *the mineral kingdoms*. In the natural changes which take place, we observe, on the largest possible scale, the gradual or sudden transition of the one of these divisions into the other; thus the trees of a forest are swept away from their native resting place, the coral polypifers cease to perform the functions of life, and the one and the other enter into the fossil state, and according to their local disposition and arrangement, if favourable to such further development, into the mineral state. Thus the bases of many of the madrepore structures consolidate with the growth of the polyps into limestone rock, trees mineralize as coal, peats are converted into an adhesive clay, and eventually into clay slate, &c., there being one indivisible chain of results from the organic to the mineral body; the living kingdom, in the primary sequence of events, taking the precedence of and being the proximate cause of production of the fossil and mineral kingdoms, the latter being the inevitable consequence of the former, which preserves its entirety only so long as it is enabled to resist surrounding influences; for on absorption of elementary and gaseous products, on exposure to atmospheric influences, to flood, or to fire, a change inevitably takes place in its organic arrangement, and it then becomes a body of other nature and of other name. The living system is the secreting power, for by the functional operations of life, the elements of air and water, and the compound properties of other bodies, are converted into earths and gaseous matters; which being thus generated, continue to exist as compound products after the cessation of life, preserving their primary qualities or uniting with each other in variable proportions,

the several combinations being governed by the laws of affinity, and the chemical and mechanical action of the living body. In the living kingdom are the elements of the alkaline earths, and according to peculiar organizations, so do these elements more or less abound; thus from some plants we extract sodium, from others potassium, some animals are simply gelatinous, others combine gelatine and albumen, and others secrete lime, phosphorus, oils, acids, bitters and sweets, these various products being sometimes abstracted from the earth, and finally returned to the earth, or, as is generally the case, they are secreted within the living system, as the result of living action, peculiar food or peculiar temperature. When these organic creatures pass into the fossil kingdom, the peculiar acid or alkaline earth is produced, but not necessarily so, for the after changes of bodies are contingent and uncertain, always depending upon their inherent qualities, and the accidental affections or combinations to which they may be exposed when they cease to be living beings; thus the tree may become vegetable earth, clay, clay slate, jasper, wood opal, bitumen, coal, jet, or other well known products, as the accidents of association may determine.

These few remarks are absolutely necessary to the right understanding of natural phenomena, for unless the primary nature of fossil and mineral matter be distinctly recognised, no real conception can be formed of the origin of bodies generated in the various unions of matter with matter. Geologists of the day admit none of the strata of which this earth is composed to be of organic origin, but such as abounds or is wholly composed of organic remains, not taking into due consideration the natural tendency of bodies to decompose, when chemically or mechanically acted upon, and to enter into new combinations according to the laws of force or affinity which govern production; but men of even common understanding see the tree converted into earth, the earth into clay, the shells of animals secreting calx into simple carbonate of lime, and also preserving their organic form in chalk, pyrites, petrifactions, &c.; many of the hills of Egypt, for instance, are wholly composed of mummelites, but others, formed by coral polyps, entirely consist of decomposed bodies of polypifers; the oolite formations of the British strata, exhibit various stages of animal decomposition, myriads of creatures differing in species and organic formations uniting as one definite and inseparable result.

Many of the superficial beds of the earth consist wholly of fossil organic bodies, and in these fossil beds the mineral bodies are gradually or suddenly generated and moulded into form, as rocks, stones, metalline earths and other substances. The fossil kingdom, in fact, embraces full one half of the superficial crust of the earth, its aggregate masses extend over the whole bed of the waters, forming in some localities mountains and mountain chains, entire islands and vast portions of continents; on the other hand, terrestrial earth is covered with forests, savannahs and meadows, insects, birds, and beasts, all of which contribute to increase the soil on which they tread. The numerous islands of the Pacific and Southern oceans, still increasing in their numbers and magnitude, the islands of the Red Sea and portions of the great continents of Asia and Africa, the broad band of reefs encircling the newly discovered continent of Australia, and the Western Archipelago, are all composed of coral polypifers and other lime-secreting species, including the relics of myriads of creatures inhabitants of the waters, which in death deposit on the respective beds their elementary constituents, such as lime, soda, magnesia, animal oil, fatty matter, iron, and other compounds, the whole being heterogeneously disposed in this general reservoir of the living and the dead; and therefore it is, that, wholly composed of organic matter, these very extensive formations most truly come under the term and appertain to the fossil kingdom; the earths which form the clothing and skeleton of bodies, the proximate principles generated by or developed within the living system or in union with each other after the functions of life are ceased, passing, by a regular sequence of changes into the mineral kingdom, the nature of species and of the changes produced by the cessation of life determining the nature of the mineral bodies or beds. These oceanic formations extend over the beds of all seas, distinct of themselves, or variably uniting with the terrestrial matters which are carried into seas by fresh water streams, or are formed from the abrasion of rocks and earths by the force of the winds, waves, or tidal currents.

Again, if we look over the surface of the earth, the same phenomena may be observed in all parts of it; upon the remains of oceanic species, beds of oysters, coral formations, and commingled material of countless tribes, the trees, shrubs, and grasses make their appearance, generating products peculiar to their natures, or becoming the food of an infinite variety of animals, the artificers of other forms and combinations of matter generated in the living system, and transferred unaltered or altered to the fossil or mineral kingdom. Geologists may contend that the sum of consolidated matter of this earth does neither increase nor diminish, but all the phenomena of terrestrial and oceanic beds give a decided negative to this assumption; for not only are tropical seas rapidly filling up with the remains of oceanic and terrestrial bodies, but the terrestrial earth itself, in localities, is continually increasing from like causes, the generation of vegetable mould being demonstrable to all men. The fossil formations of which I more immediately speak, embrace not only the vast extent of coral formations, but also all the great deserts and steppes of the earth, including all ancient, modern, and recently formed coral reefs and islands, the greatest portion of Africa, and large tracts in Asia, America, and Australia.

In a general view, the coral formations embrace the bodies and reliquæ of myriads of creatures, whose elementary constituents, received during life from the medium in which they are disposed, are set free from each other, or enter into new combinations, or are given forth to the waters; changes without number taking place so soon as, from the decrease of the waters, the reef or island appears above the surface. Exposed to tropical heat, the surface soil of the newly created land, consisting of the comminuted parts of corals, fishes and weeds, of beds of shell fish, and of consolidated madrepore structures, undergoes a rapid change into sands, siliceous pebbles, carbonates and sulphates of lime, and other products peculiar to the fossil soil and the surrounding influences acting thereon; and this excitement of change, of decomposition and re-combination in bodies and fossil beds, is not confined to the surface soil, but extends to the inner beds, varying in direction and force; thus other phenomena are simultaneously or progressively produced at this local commencement of the mineral kingdom; the generated acids produced by the recombination of the separated elements of bodies, evolve through the dry and porous strata, uniting in their passage to various alkaline earths, or uniting and contending with each other, are the primary agents of change from the fossil to the mineral state.

That many mountains owe their origin to volcanic action, is an unquestionable fact, but the bulk of aggregate is produced most undoubtedly by the moving force of waters, by depositions of organic matter chemically or mechanically precipitated, and by the gradual accumulation of oceanic species dispersed in groups and families in particular regions: there are submarine chains of mountains, embracing a geographical range of many thousand square miles, disposed beneath the waters of the Pacific and Southern oceans, which owe their origin and continuous increase to the living occupants of the waters, the deep laid foundations of these extensive accumulations having, most probably, never been affected by volcanic action; and there is one great truth practically manifest to the accurate observer of nature, that the waters are continually diminishing from the face of the whole earth, and more particularly so beneath the tropical band, where seas are shallowed by the vast increase of calcareous bodies, the living and the dead. This affords a ready solution of the many singular phenomena which are otherwise inexplicable, or are only to be explained by doing violence to nature.

The experiments of Sir Humphrey Davy led him to believe that heat was generated in the inner beds of the earth by accidental mixtures of the inflammable gases and oxygen; but, unacquainted with the phenomena of fossil soils he was disqualified from proving the soundness of his views. In these soils embracing recent formations, and also soils produced in earlier epochs, particularly when disposed in high and dry climates, in rainless regions, or within the tropical band, the electric fluid is generated in vast quantities in the interior of the earth, and, more especially, in those beds, which, in their primary fossil state contain the metals in their *uncombined* state. The virgin soils or fossil beds abounding in all parts of the superficial crust of the earth, consist of the elementary compounds of organic life, changed and perpetually changing in their unions and consequently in their properties, after they have entered the fossil kingdom, which is of necessity, before they enter the mineral kingdom: in their primary fossil state they do not embrace what, strictly speaking, may be termed mineral bodies, but they embrace the elements of many mineral substances, and under favourable circumstances, do eventually produce them, abstracting the oxygen necessary to effect these changes from the atmosphere and from the waters: for instance, an island which is formed of the comminuted particles or entire skeletons of myriads upon myriads of the inhabitants of the deep, no sooner rises its head above the waters, than it becomes exposed to new and powerful influences: the effect depending upon the nature of those influences is at once strikingly beautiful and important: a universal and intense chemical action ensues, the process of decomposition and recombination embracing every fossil body, hydrogen is driven off to form other unions, and oxygen, nitrogen or carbon supply its place, the marine acids now generated are set in motion, moving to and fro, uniting with alkaline bodies forming a very important class of salts,

or having metalloidal bases forming other mineral compounds, or contending with each other, continue for a very long period in their uncombined state. In these vast chemical changes, in this conflict of the elements and elementary compounds, is it to be wondered at, that a great and intense heat is produced, and that this heat existing within bodies of a most inflammable nature, should very often increase to the heat of combustion. Once called into action, its duration must depend upon the nature of the material by which it is surrounded, combustion being produced, it will be carried on so long as the causes of action continue to exist, or beds of inflammable matter continue the supply of fuel. Again, these virgin soils, besides the *uncombined* minerals, abound with vast accumulations of animal oils, already mineralized as bitumens, or in union with the alkaline earths entering into the condition of rock, stone, and other ponderable substances. This material, attacked by the chlorides, oxygen, &c., is likewise the subject of incessant change, and sulphurous acid in particular is generated in abundance, the vast quantities of sulphur in the inner beds of the earth being demonstrated by its evolution from all the great volcanoes, and its continued evolution is a very decisive proof that combustion is going on in the bituminous beds and animalized rocks, the skeletons or cinders of the latter being ejected as pumice and ashes.

Removed from the immediate vicinity or far above the waters, the virgin soil presents to the view one vast chaotic mass of fossil bodies and their comminuted particles, and the progress of change from this chaotic state depends entirely upon the local and general affections which govern and direct them; thus some formations undergo an almost immediate transformation, while others, protected from atmospheric and aqueous influences, remain for ages in an unchanged state. The organic remains of oceanic animals are at all times variably disposed in localities, and the nature and qualities of each stratum depends on the nature and qualities of the bodies of which it is composed, or by which it is surrounded. In the British strata we see this truth illustrated to an amazing extent, extensive districts being covered with fossil exuviæ, variously changed, but evidently the products of the same era, some of them hermetically sealed for many ages past from atmospheric influences, exhibit the same state of nature as when deposited in this their resting place, others exposed to percolating fluids have become silicified or metalline, and in this state, although the organic form and configuration of the body is preserved, as previously observed, they most truly and strictly belong to the mineral kingdom; all silicates are in fact mineral bodies, and all petrifactions belong to the mineral kingdom, the act of petrification being the act of silicification and consequent change of the organic body; thus the silicified ammonite is a mineral body—in its natural state alone can it be considered as a fossil.

The organic remains of oceanic animals and plants are at all times variably disposed in localities, and the nature and qualities of strata, necessarily depend on the nature and qualities of the separate or conjoint species of which they are composed, and the after combinations of matter with matter. The primary qualities of beds are rarely preserved unchanged for any very prolonged period of time; for exposed to atmospheric influence, or communicated or generated chemical action, the matters in union undergo a partial or complete change in their disposition and qualities, and many new substances are produced: thus the oceanic fossils under peculiar aspects soon loose their identity of character and composition, particularly when exposed to the changing influences of climate, to percolating waters, the intrusion of mineral bodies, the oxygenic action of the atmosphere, or to volcanic action; and when terrestrial matters blend those which are exclusively oceanic, the modifications of forms and substances become still more numerous and diversified. Uninterrupted by disturbing causes, there is a general simplicity in the arrangement of oceanic fossil beds within and above the waters, by which we are enabled to ascend without difficulty from effects manifest to the primary causes thereof; the coral structure, the vast bed of oysters, the hills composed wholly of particular species, cirrhipedes, the calcareous bed consisting of calcareous matter uniting with the exuviæ of marine bodies, the marl or chalk-like substance covering immense areas of the earth and abounding with fossil shells and fishes, all speak an intelligible language of causes long extinct.or at present existing, and of changes common to the several peculiar formations, changes evidently brought about by causes as evidently existing or previously in operation.

Every coral built reef undergoes changes common to all, depending upon climate and association; from the living it gradually and peacemeal enters into the fossil state, and from thence its further transition is slow or rapid according to these laws: sometimes its transition into limestone rock keeps pace with its rapidity of growth, at other times the bodies and comminuted particles of bodies undergo changes in a manner independent of each other; thus, for instance, the oceanic hills which form the boundaries of upper Egypt, exhibit an almost endless diversity in the change of their constituent parts: thus some of the fossil shell fish are converted into soft chalk, others present various stages of silicification, otherwise termed petrifaction, others decompose, and united together, are know as marble, porphyry, &c.; the like changes are observable in all newly created islands and portions of continents.

"In the province of South Australia," says Mr. Binney, "a vast fossil formation extends from about 139° 15′ of longitude, with an imperfectly known width towards 141°, the western boundary of the province; and from about 32° 40′ of latitude to at least the latitude of the sea mouth of the Murray. Its greatest elevation may be stated at 400 feet above the level of the sea: its upper strata are beds of three or four feet in thickness, composed entirely of common oysters and oyster shells, not broken or exhibiting marks of attrition. Below there are much deeper beds of mixed coral, echini, pectens, spirals, and other small marine shells, generally much broken and deposited in sand, limestone, and sometimes splenite, alternating, with beds of sand without shells. At the base of these, or beneath them, are vestages of fishes, teeth, and nautili, of four and five inches in diameter.

The recent discoveries which have taken place in the United States prove the amazing extent of fossil productions, beds of coals covering a vast extent of the superficial strata, bituminized limestones saturated *per se* with animal oil, beds of fossil organic remains still retaining their primary disposition of parts, and shales, marls, and clays evidencing by their character and composition their organic origin. "Near Newark," says Dr. Silliman, "the whole valley is one vast cemetery of animal and vegetable remains. A Petroleum oil well has lately been discovered while boring for salt water near Buckville, Kentucky, after penetrating through solid rock upwards of 200 feet thick, a fountain of pure oil was struck. The coal beds in Ohio State extend over a space of 12,000 square miles." "The rocks in the western States, below the coal formation, have evidently," says Dr. Lock, "been deposited in the bed of a deep primitive ocean, and consist of alternations mostly in thin layers varying from one inch to twenty-four inches. The crystalline strata are mostly carbonate of lime, the sedimentary strata are mostly in the lower portions clay and marl, and in the upper portions clay and sandstone, in the superior portions lime, clay, and sand form an arenaceous limestone—all of them contain fossil remains. The arrangement of the rocks, beginning from the bottom, is, 1, blue limestone; 2, clay; 3, flinty limestone; 4, clay marl; 5, cliff limestone; 6, black bituminous slate; 7, Waverly sandstone, the whole depth 1865 feet. The blue limestone region is 500 feet above low water mark of the Ohio: the limestone is sometimes 800 feet in thickness. In Indiana the black bituminous slate is above 100 feet thick; there is also a vast bituminous coal formation, the whole of the beds being evidently oceanic or of oceanic and terrestrial deposits, with beds of salt forming the lowest strata, rising in their line upwards of 3000 feet. The brine springs of New York are exceedingly numerous, and the gypsum deposits are exceedingly extensive. On digging the Erie Canal, at the depth of 42 feet were found several hundred living shell fish, species of mussel; living toads have also been found in millstone grit.

Of the fossil formations of Europe and portions of Asia, much has recently been written by geologists, to which we refer for information, concerning their extent, and the important part they perform in the economy of nature in forming strata and crystalline rocks—the phenomena of the deserts to which the following chapter will be devoted, are almost exclusively oceanic.

The gradual development of life as genera, orders and species, is inferred by philosophers of the present day, from the known fact, that the lower we pursue our researches into the bowels of the earth the less we observe traces of organic bodies, and the more simple are the orders, genera, and species, both in their qualities and properties: this is the truth as far as observation is concerned; but men err greatly when they assert that organic matter entirely disappears at a certain depth. It is true that the animal frame-work can no longer be distinguished after we have descended a certain depth: but, it is equally true, that whatever may be the nature of the lower strata, whether it be sand disintegrated, or united as sandstone, lime, or limestone, granite, or any other compact body, *all and every portion of such strata* is composed of, *and proceeds from organic bodies*. The philosopher overlooks or otherwise is ignorant of the fact that vegetable earth produced in the decomposition of vegetable and animal bodies, retains no traces within its bulk of aggregate of those bodies, death levels all distinction, confounding ten thousand organic bodies in one undistinguished ruin. Every atomic particle, every proximate principle and compound body, all that is cognizant to the senses of man—all proceed from the elementary compounds, air and water—all enter the mineral kingdom when life has departed.

M.

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III. *Klenze Entwürfe.* Heft VII & VIII.

"The importance which architecture has assumed in this country within the last twenty years, and the deep interest taken by all classes in its progress, have been most remarkable and striking. Disquisitions upon those monuments of our art which rise up around us, occupy the public mind, and form a distinguished portion of the literature of the day. Pamphlets, newspapers, and other periodical publications, pass in review the productions of our artists." Such are the opening remarks of Professor Donaldson in his "Preliminary Discourse" (pronounced before the University College, London, Oct. 17, 1842); and they may very appropriately be made use of, by way of introduction to the present article, if merely to show that the subject we have taken up, is held to be not without attraction for others besides professional readers. Indeed, we might say that the latter class is the least numerous one; and also, that very few belonging to the profession have at any time taken up their pen with the view of instructing the public, or recommending the study of the art as deserving to be cultivated for its own sake. Even may it be questioned if the profession, taken generally, cordially approve of that sort of popularity conferred upon their art, after the manner described by Mr. Donaldson. At any rate some there are, who, so far from encouraging a taste for architectural study on the part of those who apply themselves to it merely as *laymen*, manifest a decided disapprobation of such "irregular" proceedings. Fain would they suppress all inquiry, all criticism, all opinion, except what emanates directly from themselves. And as far as themselves alone are concerned they may be allowed to display sound policy at least, though the reverse of liberality, of generous feeling, and of zeal for the advancement of architecture as a branch of fine art. No doubt it is not to the interest of every one who follows it as his employment, that the public should have any clear understanding of it in the latter capacity, or be able to discriminate between what is merely mechanical and matter of routine, and what gives æsthetic value to an edifice, converting it from the mere manual work of a builder into the production of an artist.

Convenient as it may be in many—perhaps the majority of cases, to have to do with a public who are nearly all but quite in the dark as to what architecture, properly so termed, is or ought to be, and who are, therefore, ready to admire whatever is palmed upon them as works of art, merely because it is mechanically shaped *secundum artem*, but may, nevertheless, bear the same relation to art that paste does to diamonds; convenient, we say, as such state of things may be, there are, at the same time, considerable disadvantages attending it, and extending to all parties, to the profession as well as to the public, and certainly not least of all, injurious to the art itself. While its importance in the latter character is stoutly insisted upon, and endeavoured to be supported by dint of assertion, architecture is virtually thrown out of the ranks of fine art, by being represented as one too far removed from ordinary sympathy to be appreciated by, or even intelligible to those who have not been regularly initiated into it. To a certain extent some kind of preparatory training is, undoubtedly, requisite, because its beauties being more or less conventional, without any positive type in nature, some knowledge of the signs it employs, and of the principles by which it is governed, becomes indispensable; but such knowledge is quite independent of, and runs in a different channel from, that which belongs to building and construction. Neither is the acquisition either difficult or tedious—at least would not be so, were a suitable course of study provided for those who require to learn no more than the æsthetic branch of the subject, leaving practical matters to the practical man. Works, indeed, there are which profess to be expressly framed for such purpose, but among them all we have not met with one that is really well adapted to it. Some are little better than ordinary and even slovenly compilation or abridgment; and under the pretence of being easy and popular, nearly all are defectively meagre, dry, and uninviting. They lack that familiar but intelligent explanation which would really facilitate the progress of the nonprofessional student. There appears to be a fear of communicating too much information—a greater desire to mystify than to simplify. What is learned, must be learned doggedly and by rote, for however well the writers may be acquainted with the subject himself, they either want, or do not care to employ, the art of conveying instruction to others in such manner as to invest it with interest, and forcibly bring out its attractions.

On the part of the profession nothing has been done towards furnishing a popular course of instruction for lay students and the public; neither have they advocated any scheme for throwing open the study of the æsthetic department of their art, and extending it beyond the pale of their own order. Only one solitary instance occurs to us of an architect's earnestly recommending the adoption of such views. With no less of sound policy than generous liberality, Mr. G. Wightwick has urgently pointed out how desirable it is that a due acquaintance with architecture should be cultivated as one of the accomplishments of education, and that, too, for females as well as men; which is so contrary to the prejudices established by custom, that on the first blush of it, it appears to carry with it some degree of chimerical extravagance, if not of actual absurdity, and may easily be turned into ridicule by wilful representation of the purpose in view. It may be sneeringly hinted that dabbling in brick and mortar would not be a very ladylike amusement, nor even a very gentlemanly pursuit; with much more to the same effect. To meet idle objections of that kind formally, would be itself idle, since they proceed from sheer ignorance, or from still more incorrigible malice prepense, and from the determination to mistake and pervert, and to set matters in a ridiculous light.

With respect to architecture as an æsthetic study, and so far capable of being pursued apart from the mechanical processes of *building*, the usually awkward *Cui bono?* is not a very formidable question. It is the pursuit itself which is the prize, the labour which is the gain, the occupation which is the reward. Else why should the sportsman risk his neck in the chace, and willingly encounter both danger and fatigue—to say nothing of the expensiveness of his amusement, which makes every hare cost him about as much as a horse? The value of architectural study as a mere study, consists in the mental occupation it furnishes, and in its opening a source of gratification from which we are else debarred, because without such study we can but imperfectly relish what requires to be viewed by the mind as much as by the eye. Where preparatory education is wanting, the finest buildings will be looked at either with listless indifference or ignorant, perhaps merely affected, admiration, certainly not with that lively interest and enjoyment felt by those who possess a cultivated taste. Without some study of the art, people are actually unable to see a very great deal that is to be considered in a building or a design; there are an infinitude of circumstances, more or less influential, which they can neither distinguish, nor perceive, nor take note of. To be convinced that such is really the case, we need merely open almost any tourist-book where architectural description or comment is attempted; for seldom do we meet with more than confused, imperfect, and bungling description, or what is intended for such, and with crude, hasty, shallow, haphazard remarks, which too evidently show that the writer has no real knowledge of what he professes to speak of.

It is true that, by opening our eyes, the study of the art drives us out of the "fool's paradise" of stupid wonder, where ignorance is bliss; yet if, on the one hand, it renders us more fastidious, and apt to be shocked at defects and imperfections that do not interfere with the satisfaction felt by ordinary spectators, on the other it greatly enhances our enjoyment of what is excellent, imparting to it a fulness, an intensity, and a gusto, which can else hardly be conceived, much less be felt. While enjoyment, too, is thus increased in degree, it is also greatly extended as to duration; instead of being an object merely to be glanced at, or inspected once for all, a fine piece of architecture is to the educated man, whether amateur or professionalist, a work of art which, however often it may have been viewed, is again contemplated with refreshened feelings of delight, and whose image is faithfully stored up in the memory, where it remains both for instruction and gratification. Unless it be useless to have some study or pursuit, affording both innocent and intellectual occupation, the question as to the value of that of architecture among others may be considered, after what has been said, completely settled. So far from having at all less, it has rather more to recommend it than several—botany, mineralogy, and some others, which are now applied to by females, inasmuch as it exercises the critical faculties, leads to the valuable habit of discriminating observation, and forms and refines taste or æsthetic feeling; whereas other studies, of the kind above alluded to, have comparatively little value as mere accomplishments, since they are too positive and material, too remote from general sympathies, and partake of that *Darwinism* which renders them as unfit for conversation as for poetry.

For what we have been saying, we admit that there ought to be no occasion: it should long ere this have become so self-evident, as to incur for us the reproach of bringing forward stale and common-place remarks. Yet, be the remarks themselves what they may, most certain it is that the views we advocate are not those entertained by the public, no, nor even by the profession. Accordingly, instead of

being upon the same footing as the other fine arts, architecture has scarcely any public sympathy—there being few, except those who practise it—and not every one among them, who can truly appreciate the powers of architecture, and its poetical value, apart from its prose one of actual utility. Even when the importance of the former happens to be urged on the public on some particular occasion, it is more with reference to display of public spirit, and regard to our dignity as a people, and our national credit, than for the sake of any particular enjoyment proposed to be derived to ourselves from the contemplation of a noble work of art. No one, however, seems to be aware that if architecture is to flourish among us as a fine art, it must be recognised as such, not in words alone, but in a real feeling for it, and that feeling cultivated by study. It is rather unreasonable to expect that the public should warmly patronize what they have no real relish for, and what, indeed, their present ignorance renders them incapable of patronizing properly, were they even disposed to do so. They have hitherto been taught to regard the merest plodding mediocrity as talent—the servile mechanical copying of individual features and parts, as praiseworthy correctness, though even nothing of the spirit or character of the originals should be preserved, or if so far at all kept up, be entirely lost sight of in whatever is not immediately borrowed.[1] Hence the minimum of talent has frequently sufficed for distinguished professional reputation, provided its possessor has been able to get into full employment, and establish himself with the public as the "fashionable architect" of the day. It is not the quality, but the quantity of his works, and their importance as large buildings, which recommend him, and impose upon general opinion. Of those who have been thus "successful," if mere prosperity in their profession can here be termed success, most have shown themselves to be little more than men of business, and as such clever enough, but as artists, more or less deficient in nearly all that goes to constitute one; for their productions too plainly show no earnest *con amore* labour—no thorough artistlike study of the subject has been bestowed upon them, no spirit infused into them, and that what merits they may chance to possess are merely those of mechanical routine. Tolerably secure of satisfying their employers, few architects have laboured to satisfy themselves, or to aim at higher and more durable fame than that which they find comes to them upon cheaper terms.

Although they might be, seldom is it that moderate opportunities are so turned to account, as to be thereby rendered important ones, so as to give us highly-finished gems of art—such, for instance, as is the monument of Lysicrates—where the effect attending grandeur of dimensions is out of the question. Even in Gothic architecture, where magnitude and extent are generally held to be indispensable in order to produce due character, many of the choicest and most elaborate specimens are to be met with either in moderate sized buildings, or the subordinate parts of larger ones—such as porches, chapels, chantries, oriels, and the like, any one of which shows more study of design, more regard to artistical feeling and principle, than is generally considered requisite for an entire fabric, let it be as extensive as it may. Whatever an architect has in hand, he should consider it of importance, and endeavour to render it so, by the attention bestowed upon it, as he will always retain a sort of mental property and authorship in it, even should he never afterwards behold his own work. If, controlled by circumstances, he cannot do all he could wish, let him at least show that he is capable of producing things far superior; if he cannot indulge his imagination, or fully carry out his ideas, he may convince us that he has some ideas of his own, and may put in those artist-like touches which—supposing him to be worthy of the name of artist—would cost him very little—nothing, it might be presumed, in comparison with his self-forbearance in abstaining from them.

At any rate we ought not greatly to wonder at finding that, as it is not usually employed upon ordinary occasions, architectural talent is frequently found very rusty and out of order when suddenly called for by some extraordinary one. We then obtain little more than some common-place and hackneyed ideas as usual, only on a larger scale, and spread over a greater surface. Harsh as this opinion may seem, it is but too strongly borne out by the three architectural competitions for the Houses of Parliament, the Nelson Monument, and the Royal Exchange. On each of those occasions, all the designs sent in were exhibited, and the greater majority of them too plainly told that their authors had no pretensions whatever to come forward, unless, indeed, they calculated more upon the imbecility of others, than on their own strength. Some of the designs for the Houses—and those not exactly the worst of all, were little better than wholesale plagiarisms, unskilfully put together. It is not to be denied that the subject was a most difficult one—one requiring no ordinary grasp of mind, and fertility of ideas; neither was the Exchange by any means an easy one, considering the very awkward form of the site, and other restrictions. Not so, however, with regard to the Nelson Monument: that was a perfectly *ad libitum* affair, and altogether free from any conditions, nothing more being required than a noble and appropriate architectural object, full scope was allowed to invention and taste—and to a species of talent that rarely has opportunity of displaying itself at all. Whether the requisite talent kept itself hoarded up, we pretend not to say, but certainly little—if not the minimum of it, showed itself upon that occasion. Of invention there was hardly anything but of tasteless and preposterous ideas, not a few; some, indeed, that if they did not partake of downright insanity, betrayed hopeless idiocy. What renders that competition the more remarkable is, that a second trial was afforded the artists, after the first one, but with no greater success—at any rate with precisely the same result as before, merely a fluted Corinthian column upon a pedestal—very poor and now somewhat stale conceit in itself, and in this case without any redeeming qualities in the design to reconcile us to it.

If we learn nothing else from competitions, we learn from them that whenever they take place, the profession becomes sensible of one very great disadvantage which their art has to struggle against namely, the all but entire ignorance of the public in regard to it, and their inability to form any judgment, although every one is, of course, at liberty to express his own opinion—even those who can scarcely read a plan or elevation. To say nothing of the unfairness so frequently imputed to committees and those appointed to decide on such occasions, of their incompetence generally there can be little doubt; indeed, it would rather be strange were it otherwise—if men, who perhaps have never taken up the study at all, were able duly to examine all the several designs, and maturely deliberate upon their respective faults and merits.

This picture of things is neither a very flattering, nor particularly encouraging one, but we will venture to assert, neither is it an exaggerated one. We have pointed out where the main root of the evil lies, and though we cannot look for its being very speedily corrected, there is some prospect of its being overcome. Already are there favourable symptoms and manifestations abroad; and although it yet forms no part of the usual course of education, architectural study is beginning to make its way among the educated classes; as is proved by the various elementary publications, intended for the use of amateur students. But it also behoves the profession itself to encourage, or to show that they are disposed to encourage, this growing but not yet sufficiently confirmed taste; and to endeavour to render the study of their art more popular and attractive. It would seem, however, that professional men either are incapable of writing upon matters connected with their art in an intelligent and engaging manner, and putting off the solemn *ex-cathedra* tone they usually fall into whenever they appear in print; or else consider it beneath them to accommodate themselves to general or non-professional readers. Those who have published at all, have rarely had in view more than an exceedingly limited class of purchasers—wealthy amateurs, who can afford to purchase works which are not only so costly, but so inconveniently large, that their form as well as their price operates almost as a prohibition upon them to all others. This may have arisen from the idea that no class of the public could take interest in or have occasion for works of the kind, except those who were likely to have occasion to build for themselves in a superior style, and who have accordingly been looked up to as patrons: which appears to us to be a mistaken notion, and withal, rather short-sighted policy. It may fairly be questioned whether the study of Gothic architecture would be a tenth part so popular as it has now become, had most of the publications relating to it been upon the same scale as the Cathedrals, edited by the Antiquarian Society: unimportant as the circumstance may seem in itself, there is little doubt but that the adoption of the ordinary quarto size—which is large enough for almost any purpose, provided there be plates of details, as well as general elevations and sections—has greatly diffused a taste for it, by bringing the study within the reach of those who would else have been debarred from it, or might never have become acquainted with it.

The time is gone by for that species of literary exclusiveness and ostentation, which was affected in the days of colombier and elephant folios. Like many other branches of literature, architecture must now condescend to consult the convenience and the pockets—not exactly of the "million," but of the "many," unless it not only disclaims

[1] As a notable instance of this, we may refer to that extravagantly praised building, St. Martin's Church. The portico and the body of the structure (including the inner wall of the portico, seen through the columns) are most offensively at variance with each other in point of style and taste; so much so that it may fairly be questioned if the architect really understood or felt the character of what he professed so far to follow. Besides its incongruity with the portico, all the rest of the exterior is most tasteless in itself—heavy without grandeur, and not only heavy but barbarously uncouth.

but can afford to dispense with popularity. That it can do so may be the opinion of some, but hardly of the majority of the profession, or of those who are attached to the art; else they are inconsistent in deploring at the same time the indifference, or obstinacy, which has so frequently marred some of the noblest projects; and the ignorance which has either wantonly destroyed, or suffered to fall into entire decay, many interesting monuments of former times. However great may be our regret at such acts of "barbarism," their occurrence is no more than quite natural, when the "respectable" and well-informed classes have no idea of the value of, and no taste for, what in their eyes appear no better than so many masses of old walls and rubbish. As far as the profession itself is concerned, the hitherto all-but-entire ignorance on the part of the public, may occasionally have been found convenient enough; but then the art has suffered accordingly, and our national reputation likewise, as far as it is at all connected with the state of architecture among us. Were the study to be generally cultivated to the extent that we—and not only ourselves, but some belonging to the profession, desire, the public would probably soon begin to be more difficult to please; to be more *exigeant*, and less indulgent than heretofore; and to look for some manifestation of artist-like talent and power on the part of those who claim to be considered artists—a rank now held by many of them merely by courtesy, as a sort of *brevet* title. Yet this would be so far from being matter for regret, that it is precisely what would materially contribute towards the advancement of architecture, by spurring on its followers to keep a-head of the public, in taste; so as to be able not merely to fulfil all that improved taste may require of them, but even go beyond that point to which we are content at present to limit our views.

That the idea of an impulse being given to architects, by those who do not belong to their body, and who if they cannot exactly be called the public, are at least a section of it—is not a chimerical one, is evident from the fact that the study both of Grecian and Gothic architecture was in a manner *forced upon* the profession, in consequence of the attention bestowed on those styles, by dilettanti, antiquaries, and amateurs, at a time when Grecian architecture was unknown to the profession except by name, and when Gothic was so far from being known that it was utterly misunderstood, and condemned as being contrary to all sound principles of taste, and all beauty of proportions! It was not architects who first opened the eyes of the public, but literary students and others, who, free from professional prejudices, opened the eyes of architects themselves, as well as those of the public, to the merits and importance of the Gothic style: and it is to such writers that we still continue to be indebted for many interesting publications relative to the subject of the architecture of the middle ages, both in this country, and upon the Continent. In calling attention to this circumstance, we would not have it supposed that we do so for the purpose of casting any reflection upon the profession for their supineness in not investigating for themselves, that truly wonderful and beautiful style of the art: on the contrary, whatever reproach of the kind may justly apply to those of a former day, we feel pride in being able to say that we have some living architects who not only perfectly understand, but are thoroughly at home in that style; who are not only conversant with all its varied elements, but who can enter fully into its spirit, with that genuine artist-like gusto and feeling, which are immeasurably superior to mere literal fidelity.

So very far is it from being our object to excite any jealous and unkindly feelings between the profession and the public, that it is our most earnest wish to see them amicably united in one common aim—the advancement of architecture. Yet such is not likely to be the case if those who belong to the profession, affect to treat with scorn those who do not, assuming a tone most arrogant, contumelious, and disrespectful tone towards that part of the public, which they ought to look upon as their friends—at least as engaged in the same cause as themselves. This, however, has been done premeditatedly and for the nonce by the author of a work whose very title would seem to indicate, that it is intended to facilitate and popularize the study of architecture, and thereby increase that very class of persons towards whom he displays such strange, and we might almost say, savage hostility. In his "Encyclopædia," Mr. Gwilt has seized on every opportunity of sneering or snapping at all who presume to write upon, or apply to the study of, architecture, without being duly qualified by a professional education, and by an acquaintance with the mechanical processes which, though indispensable for the practical man, are as far as *art* is concerned, of no more moment in architecture than in any other of the fine arts. Instead of expressing any satisfaction at finding that architecture receives from persons of taste and liberal education the homage due to it in its quality of a fine art, and that it is considered worthy of being studied for its own sake, he has vented his spleen in remarks that may fairly be called suicidal, they being calculated to obtain for his book a character anything but favourable from that part of the public whose opinion of it is likely to be of most weight. Most assuredly he has not cared to conciliate the good opinion of either Oxford or Cambridge, for speaking of the attempts to ascertain the origin of the pointed arch, he says, "the question has furnished employment to many *literary idlers, especially at the Universities*, whose time might have been more usefully employed in looking after the young men under their charge, especially as they have all, except Whittington, done little if anything towards advancing a knowledge of the subject, which involves information possessed by few of them, of whom the latest have done the least."

Here we see that, not satisfied with bringing against such persons a sweeping charge of incompetency, and applying to them the sneering epithet of "literary idlers," Mr. Gwilt carries his illiberality so far as to insinuate or rather assert, that they neglect positive and more important duties, in order to amuse themselves with architectural studies, or what they fancy to be such! We suspect, however, that the fierce enmity here displayed towards that class of writers and students may be, in a great measure accounted for by their having contributed to spread a taste for Gothic architecture, and thereby bring that style again into vogue, to the neglect of the Vitruvian and Palladian—Mr. Gwilt's favourite schools of the art. That such is really the case appears pretty plainly when we afterwards read:

"Among the architects of Wren's time, there was a triad of amateurs who would have done honour to any nation as professors of the art. The first of these was Henry Aldrich, D.D., Dean of Christ Church, Oxford, who died in 1710. He was attached to the Venetian school, as we may see in the three sides of the Peckwater quadrangle, and the garden front of Corpus Christi College, a façade which, for correct taste, is not surpassed by any edifice in Oxford. The second of these amateurs was Dr. Clarke, one of the Lords of the Admiralty in the reign of Queen Anne. This distinguished amateur sat for Oxford in fifteen sessions. The library of Worcester College, to which he bequeathed his valuable collection of architectural books and MSS. was from his design. He built the library at Christ Church. The third was Sir James Burroughs, master of Caius College, Cambridge, by whom, in 1703, the chapel of Clare Hall in that University was beautifully designed and executed."

It is consolatory to find from this that "amateurs" are not, as might be inferred from other passages, necessarily superficial pretenders, and mere idlers who might employ their time to better purpose. Nay, the opinion expressed of that illustrious "triad" appears to us to err almost as much on the side of liberality, as other remarks in the book do in the contrary extreme. But then they were *safe* men—orthodox in their architectural creed, and did not set themselves up as instructors of the public; for though the Dean published a treatise on architecture, it was written in Latin. It is only living or recent amateurs and writers on architecture that Mr. Gwilt would, if possible, put down—those of a former day are, of course, past doing any mischief; and we are wicked enough to fancy that the highly commendatory passage we have quoted was partly intended to heighten by contrast, the censure so liberally or rather so illiberally heaped upon the present generation of architectural amateurs and dilettanti students. Though the author of the "Encyclopædia" has not mentioned names, it is very easy to discover many of those whom he classes among the "last" and least worthy, for in the catalogue of works recommended to the student, he has omitted several publications, which, so far from being unimportant or obscure, are very popular, and now regarded as standard authorities. Among them are Hope's History of Architecture; Rickman's valuable work on Gothic Architecture; Parker's Glossary, a book which Mr. Gwilt would have done well to take as a model for his own Glossary; Professor Whewell's Architectural Notes; Willis on the Architecture of the Middle Ages; Wood's Letters; Wilkins' Atheniensia, Magna Græcia, &c.—in fact so many, foreign ones included, that they would form an appendix of considerable length. Hardly can it for a moment be supposed, that such and so numerous omissions were other than intentional; or could it be proved that they arose either from sheer oversight, or ignorance of the existence of the above-mentioned publications, it would not be saying much for Mr. Gwilt's industry. But the omissions are so remarkable, and of so peculiar a kind, that we can attribute them only to a determination to suppress the titles of publications which, for some reasons or other, are obnoxious to him; and thus markedly, though silently, express his condemnation of them. Here again, then, he has suicidally injured his own book, rendering that catalogue an exceedingly defective and imperfect one, in order to gratify his own splenetic whims; and he has, in some instances, mentioned earlier and inferior editions of architectural publications which, in subsequent ones, have been materially enlarged and improved.

Nowhere, however, has he carried his exclusiveness or principle of exclusion to greater length, and more palpably betrayed his jealousies

and prejudices, than where no feelings of the kind should have been allowed to interfere with the plain duty of a chronicler: we allude to the List of Architects, which record we naturally expected to find tolerably copious towards the end of it. Instead of which, it gives but a very meagre sprinkling of names for the last 50 or 60 years, and those appear to have been merely picked up by chance, and inserted without any regard to principle or system. At all events, it must have been a most singular principle of selection, which, while it admitted many names of far inferior note, rejected those of James Wyatt, Sir Jeffry Wyatville, Wilkins, and Rickman. Although we ourselves do not estimate his talents very highly, the first of these established for himself a historical name in the annals of our architecture, if only as the reviver of the Gothic style—on which account, perhaps, it is that he is here excluded, and perhaps, again, both Sir Jeffry and Rickman for their attachment to the same style. But then how is it that the "Palladian" Calderari is passed over, Temanza, who was also the biographer of the Venetian architects, and Piermarini and Cagnola?—and that, though there have been several of considerable note, there is not the name of a single Italian architect who has died within the last half century? Again, why has one who professes to think so very highly of modern French architecture as Mr. Gwilt does, omitted so many names belonging to that nation—above all that of Durand, whose system of interaxal divisions of a design, which to us appears a very mechanical and plodding one, he so warmly recommends, and has brought forward in his Encyclopædia? That he should have *black-balled* Schinkel as undeserving of being admitted into the company of his "worthies," is no more than we expected, after his laboured attempt, some years ago, to depreciate, not only that eminent architect, but all the rest of the modern German school. Here again, then, Mr. Gwilt has suffered his prejudices, piques, and antipathies so far to get the better of him, that he has wilfully maimed that List, and deprived it of much of the value and interest it else might have had; nor would it have been less serviceable had the dates of births and deaths been given, as they are in a much fuller table of the kind, though commencing only from the beginning of the 18th century, printed in the "*Civil Engineer and Architect's Journal.*" Does Mr. Gwilt really hope to extinguish the name of Schinkel by the marked omission of it, not only in that List of Architects, but in his chapter on German architecture? If so, he is likely to be disappointed, since the course he has adopted is calculated to excite surprize, and to force that name more strongly into notice than if he had mentioned it as matter of course. Great, too, must be his vexation at learning that it is now proposed to erect a public monument to the "Great Schinkel," and that since his death more has been written throughout Germany on him and his works than has appeared relative to any other architect of the present or last century.

Having thus far touched upon the subject of German architecture, we may now as well turn at once to that chapter of the Encyclopædia which professes to give some historical account of it. In what degree it performs the promise its title implies, what information it affords, and what pains have been bestowed upon it, may easily be conceived, when we say that it amounts altogether to no more than a single page and a few lines! In fact it consists of only a few slight unconnected and desultory remarks such as almost any one unacquainted with the subject could have picked up and patched together. It is not without reason therefore, we suspect, that Mr. Gwilt was unable to go to any, even the most ordinary sources of information in the language itself, for had he done so he might easily have compiled a good deal of interesting matter that would have been almost quite fresh to the English reader, and would have formed a tolerably satisfactory outline sketch. What few names he does mention—and they are bare names —*vox et præterea nihil*, are, with one or two exceptions, comparatively obscure and of minor interest, for they belong to a period when the art cannot be said to have had a school of its own in Germany, but merely adopted the routine established in Italy and France. It is only within the present century that architecture has there produced modern works that have attracted the notice of all Europe, not only by their number, their magnitude, and their importance, but by their quality, and by the artistical study they display. Yet these are passed over entirely; not even the names of any such buildings or their authors are mentioned; for which most provoking silence, that is, provoking, not to ourselves but to those who are unable to obtain for themselves information of the kind,—the following most extraordinary apology is offered: "The circumstance of the principal works of Germany, at Munich, Berlin, &c., having been executed by artists still living, we feel precluded here from allusion to them, because if we were to enter on an examination of them we must detail their defects as well as their beauties."

A flimsier excuse can hardly be imagined, or one more illogical and contradictory: it would appear from what is here said that "allusion, to" and "examination of" any of those works would be the same thing; at least that they could not be alluded to, or mentioned at all without some further examination of them being gone into; nevertheless this formidable difficulty has been completely got over by Mr. Gwilt in every other chapter of the kind in his work, for among all the buildings enumerated, mentioned, or "alluded to," by him, scarcely any can be said to be "examined" or commented upon. So far indeed from their "defects as well as their beauties" being detailed, he has contented himself with asserting merely the one or the other, as the case may be, without entering into any critical investigation, or even attempting to relieve the dryness of a mere muster-roll, by occasional description and remark. As to the other scruple, namely that of passing any opinion upon the works of "living artists," it is extravagant in itself, and absolutely ridiculous coming from one who made no scruple whatever of pouring unqualified censure, and even coarse abuse, on the whole living race of German architects, in his so called "Elements of Criticism." On that occasion, he not only undertook his task quite voluntarily, without its being expected from him by any one, but so far from feeling the exceeding delicacy of the office he so imposed upon himself, inasmuch as it required him to point out "defects as well as beauties," he did not even think it incumbent on him to point out beauties as well as defects, for it then suited his purpose to see nothing but the latter!

New and singular doctrine at all events it is, that the works of living artists are not fair subject for criticism—in fact, cannot be spoken of at all without violating propriety, and risking the giving offence. Though artists as well as literary men be of the *genus irritabile*, we do not imagine that either the one or the other are so excessively sensitive and thin-skinned, so exceedingly averse to be alluded to even by name, or have their works spoken of in print, as to look upon silence as compliment and favour; on the contrary, very many of both are eager to be spoken of as much as possible while alive, knowing there is not much chance of their being so after they are dead. According to such ultra-refined notions of delicacy and propriety as those which are pretended to be entertained by the author of the Encyclopædia, we ought as yet to find nothing in print relative to the works of Thorwaldson, Cornelius, Hess, Schnorr, Schwanthaler, Klenze, Gärtner, and many others who are still living, but have nevertheless been spoken of in various publications, and some of them at considerable length. In fact there would be an end at once to all contemporary criticism and contemporary biography, both which Mr. Gwilt is so fearful of even approaching, that he has deemed it prudent not to attempt to bring down the history of English architecture later than the time of Revely who died in 1799, which he, by-the-bye, is pleased to call bringing it down to "the end of the reign of George III"! Some may think that the reign of George IV., when a fresh impulse was certainly given to architecture in this country, might very well have been included also; but no, "further," says Mr. G. "we should not be able to pursue our inquiry (?) without coming into contact so with our cotemporaries and their connexions, that our office, if not dangerous and fearful, might be unpleasant." Yet many since Revely's time have gone off the stage so many years ago, that they might have been spoken of without the slightest danger of giving umbrage to any of their surviving connexions, unless made the subject of highly offensive and improper remark; whereas, at present, it looks as if they were all such a degenerate race that nothing whatever could be said of them and their works, except in the shape of censure.

If he was withheld by delicate considerations of that kind from noticing any of the recent architects of his own country, hardly can Mr. Gwilt have been deterred by any such feelings from speaking of foreign ones, of those still living as freely as of those who are dead. In regard to them he could have expressed himself impartially, without suspicion of his praise being dictated by flattery, or his censure pointed by jealousy of professional rivals. In criticising literary productions it is not always possible to avoid remarks which more or less affect the personal and moral character of their writers; but from this inconvenience, if such it be, architectural criticism is altogether free. Besides, mere matter-of-fact information and description would have sufficed, and while they would have been perfectly innocent, they would undoubtedly have been most welcome. An Encyclopædia is expected to contain if not the fullest, the latest and freshest information, yet so very far is this from being the case with Mr. Gwilt's, that it in that respect lags behind even some general encyclopædias, whose architectural articles show more industry of compilation and research, and contain a good deal of matter altogether wanting in his. Most of those in the Penny Cyclopædia are very interesting, and there are also several articles in that work, belonging to architectural biography which there appear for the first time, we believe, in an English dress. Among others those on Ventura Rodriguez, and Quarenghi; neither

of whose names are once mentioned by Mr. Gwilt, although the one was *the* Spanish architect *par excellence*, of the last century, so highly extolled by Ponz, and the other hardly less celebrated at the opposite extremity of Europe, where he was extensively employed at St. Petersburg. After this, the reader will not be very much surprised at our saying that the two chapters respectively appropriated to the architecture of Spain and Portugal, and that of Russia, are exceedingly meagre, stale in matter, and unsatisfactory in execution. In fact they add nothing at all to what might be picked up out of very common books; and although Mr. G. may not be acquainted with Spanish, and therefore not able to avail himself of Llaguno's "Noticia de la Arquitectura de Espana," he would have found many valuable materials for his purpose in Cook's Spain. However well qualified upon the whole for so extensive an undertaking, we do not think any individual can do justice to every one of the multifarious subjects it comprises; yet if so far demerit is removed from the writer or compiler, it still attaches to the work itself, therefore it would have been more satisfactory had assistance been obtained for those portions of the "Encyclopædia," where it was evidently required.

But to return to German architecture,—for we consider it deserving far greater attention than Mr. Gwilt has bestowed upon it, or thinks that it merits,—it is truly singular that one who may be presumed to take a generous pride and interest in the art, should evince such sullen, chilling indifference—or worse than indifference—towards the noble and splendid architectural achievements by which Germany has distinguished itself within the course of the last thirty years. Even if the architects themselves have not, in every instance, acquitted themselves in a manner perfectly satisfactorily, or so well as might have been expected from the opportunities afforded them, still they who provided those opportunities are entitled to our grateful admiration. Under their auspices a new æra in the art has commenced; a new generation of talent has sprung up,—one endued with vigour of mind, and which, abandoning the drowsy routine of the last century, ventures to think for itself, and is less observant of rules than of principles. Whether he himself was altogether the great artist his countrymen hold him to be, or not, Schinkel's influence not only was, but continues to be, very great; and to that influence may be ascribed the higher views now taken of the art, and its æsthetic principles. To him belongs the merit of introducing Grecian architecture, not only in greater purity as to style, but with less violence as to its native character and original elements than it had been before applied on any part of the continent. Yet, though he opened that track for himself, it must be confessed that he did not make that further progress in it, which some of his earlier works promised. Had he carried out to greater extent, and with more freedom, the system he appears to have originally laid down for himself, there is every reason to suppose that he would be degrees have formed a style consistent in itself, and at the sametime providing for all those circumstances which must be *imagined for* Grecian architecture, if it is to be employed by us moderns, since they cannot be immediately borrowed *from it*. How tastefully he could modify, or we might even say invent, classic ornament and detail, is proved by the capitals designed by him for the columns in the sculpture room of the Berlin Museum; and it is therefore to be regretted that he did not treat with similar if not exactly equal freedom the entablature of the external order, where he has strictly adhered to authority in what we cannot help holding to be its defect. The cornice of the Hellenic Ionic, always appears to us to be unsatisfactory, and at variance with the character of the order in all other respects: owing to its want of depth, and the comparative plainness as well as fewness of its members, it rather disagreeably contrasts than accords with the fluted columns and their luxuriant curling and otherwise highly enriched capitals; in which the greatest degree of embellishment is obtained, and there stops; so that that which is or ought to be to the whole order what the capital is to the column itself,—its completing decoration, looks comparatively poor and unfinished.

An examination of all Schinkel's buildings and designs, would be—we will not say a wearisome task, certainly not so to ourselves,—but one of such length that we must here forego it, merely referring our readers to what is said of them by Dr. Kugler in his "Karl Friedrich Schinkel: eine Characteristik seiner Künsterichen Wirksamkeit." There is also another memoir or similar "Characteristik" of him by O. F. Gruppe, which is in some respects more complete, and which speaks at some length of one of his latest, and it would appear, most successful labours,—the designs for a most magnificent villa for the Empress of Russia, at Orianda, in the Tauridan Chersonesus, between Kaffa and Baktschisarai. The spot selected by the Empress for this summer retreat is upon a rocky declivity, at a height of about 1,500 feet above the level sea, and in a horizontal direction about 2,000 feet from the sea beach. There either is to be, or was to have been erected—for that point is left doubtful by the writer, an extensive pile, seated on a terrace platform, and consisting of various pavilions, connected by colonnades. Unfortunately, such detailed description as would enable us to form some tolerably clear idea of what appears to be no less varied and complete than extensive in its plan, is not attempted; therefore from what is said we can collect little more than that there would be *atria* and open courts, surrounded with columns, with occasional vistas from one to the other, and embellished with 'mosaic columns,' inlaid pavements, fountains, flower-beds, and choice plants growing in vases, &c.; and in the largest or central cortile there would be a lofty insulated structure, towering above all the rest, so as to form a striking feature in the general composition. In this project Schinkel, we are told, gave free scope to his fancy, and availing himself of the unusually favourable opportunity the peculiar nature of the subject presented, endeavoured to combine all the scattered rays of Grecian architecture, and also concentrate in one work some of his own happiest ideas.

One thing is certain, that whatever change of opinion may take place as to his merits and talents, Schinkel will henceforth be a prominent name in architectural history, although he has been passed over as if he was the merest cypher, in the "Encyclopædia;" and that he should have been so, is all the more strange, inasmuch as there would else have been an opportunity of touching upon the subject of Grecian architecture, properly so called, with reference to its applicability for modern purposes, and the attempts made to revive it in original purity, and so as to preserve its poetical character.

Mr. Gwilt, or any one else, might stand excused for not attempting—we will not say to describe, but to enumerate all the monumental structures which have of late years been erected not only in those two *foci* of art, Berlin and Munich, but in various other capitals and cities throughout Germany. Yet that he should not have named any, shows an excess of caution,—a consciousness that their bare *names* would suggest themes of admiration to many—to those at least in regard to whom he is pleased to remark, that "an extraordinary species of bigotry has laid hold of them" in favour of German architecture: an observation, by-the-bye, that does not come with peculiar grace from a writer who shows himself throughout his work to be bigotted and dogmatical in an offensive degree.

There is at least one edifice to which Mr. Gwilt might have referred, if only as an instance of what German energy and perseverance can accomplish, and also to convince his readers, by so doing, that he entertains no bigoted prejudices *against* German architects,—we mean the WALHALLA,—a structure not likely to be passed over in silence by any other historian of the art, let him be of what country he may; for its fame will outlast the solid masonry of which it is built, if not the hill on which it stands. Although only one of the many magnificent architectural schemes, begun and accomplished by Ludwig of Bavaria, it would have sufficed for his fame, and proved how justly he is entitled to the epithet of "*Kunstliebend*." The idea of erecting a temple to the universal genius of Germany, where should be assembled the images of all its most illustrious sons, who signalized themselves and their country, in arms or in art, as sovereigns or as legislators, as philosophers or as poets, had long been a favourite one, cherished by him for many years before he came to the throne.

It was in February 1814, that a programme was first issued, and architects invited to send in designs, none of which, however, proved satisfactory; wherefore nothing further was done until the beginning of 1821, when Klenze (the architect of the Glyptothek) was instructed to prepare a fresh one. Even this last was greatly modified afterwards, nor was it begun to be carried into execution until 1830, when the first stone of the substructure was laid October 18th. But if up to that time there seems to have been a good deal of procrastination—easily accounted for by the number of other important works then in progress at Munich itself, no want of diligence and energy showed itself in carrying on the building when once commenced, for it was finished before October 1842, and solemnly inaugurated on the 19th of that month. Thus within somewhat less than twelve years has been successfully completed one of the noblest works of art undertaken in modern times, and one that, considered merely as to its magnitude, exceeds many a building that has been the labour of an entire century. The edifice itself is a work of great magnitude, not so much on account of its mere size—for in that respect it is not at all remarkable, as of the extraordinary solidity of its construction and material, the astonishing care with which every part both of the exterior and interior is finished up. Many other edifices of note are more or less imperfect on their exterior; some present little more than a façade, and in scarcely any is the same degree of *finish*—which is not to be confounded with decoration—kept up throughout. But, though if taken only by itself, the Walhalla would still be an astonishing work, the Doric peripteral edifice is only a part of the general external design, it being reared upon a lofty and colossal substructure,

consisting of Cyclopean walls, flights of steps, terraces and platforms, and containing within a spacious souterrain of massive vaults, to which there is an extrance from the first terrace. Measured from the lower step of the bottom flight to the bases of the columns of the portico, the height of this vast and widely spreading-out basement is 138 feet, and from that level to the apex of the pediment 57, making the entire height 195 feet. The ascent is first by a single flight (64 feet wide), then by two others right and left, at right angles to it, which bring us to the lower terrace. From this two similar flights returning in a contrary direction to the others, meet at the bottom of the last or upper flight, which leads immediately up to the portico. Thus, as shown in elevation or geometrical drawing, the building appears to be raised on a vast pyramidal mass 210 feet wide below, and 138 high; but except the whole be viewed from a considerable distance, the actual appearance is altogether different, because the terraces are so lofty (the lower one 67, the next 37 feet), and extend so far forward in front (above 200 feet) that the building itself is quite lost at first, and does not come into view until the last flight is reached, when its magnificent pediment filled with statues burst upon the eye with an effect infinitely superior to what it would have been had the portico been visible during the whole ascent. No general view of the building conveys any idea whatever either of this, or of the terraces themselves, because in every representation of the kind, the whole must be shown from such a distance, and from so preposterously elevated an horizon, that while it is falsified by this last circumstance, it looks quite insignificant upon paper—no better than a little model. In order to convey an adequate idea of the grandeur and variety attending this portion of the design, at least a dozen strictly architectural drawings would be required, describing both the terraces themselves, the views obtained from them at different progressive heights, looking towards the building or the contrary, and one within the portico, showing the prospect seen through the columns. But this would be requiring a good deal beyond the power of the pencil to accomplish, it being impossible to express the effect of looking *immediately up or down*—up to the portico as seen towering above, as soon as seen at all, and down upon the terraces which have been ascended.

The interior of the Walhalla certainly does not fall short of the promise held out by its exterior, for if in the latter, the architect has aimed at no more than producing a faithful likeness of one of the most celebrated structures of antiquity, he has here shown his invention in the happiest manner, and united to the beauties of the original structure, others not possessed by it. Of interior architecture, the Greeks appear to have had very little—their theatres were uncovered, and therefore partook more of the nature of an open court, than of the inside of a building, and the cellæ of their temples either had no other light within than what they received from the door, or were *hypæthral*, that is, open to the sky, not entirely, but in the centre, in which case they also must have had the character of an open court, with no shelter but within the colonnades along the sides. Although it is still matter of dispute with some, the Parthenon is generally supposed to have been hypæthral, but whether it were so or not, the interior could by no means have corresponded in architectural beauty, with the exterior. Of the German Parthenon, on the contrary, the interior affords an example of a perfect architectural climax, it being as much characterized by splendour and richness, as the exterior is by graceful severity. All that is not marble, is bronze and gilding; the pavement is of marble, inlaid in a pattern of various colours; the walls and shafts of the columns and antæ, are of brownish red marble, from Salzburg; the entablatures, capitals, &c., of white marble, partly relieved by gilding and colours, while the ceiling is entirely covered with plates of bronze highly gilt. Were no other part of the interior worthy of notice, the ceiling alone would call for special examination, since there Klenze has fallen upon a most happy idea, one entirely original, yet so natural, and so perfectly in accordance with what is one of the most characteristic forms in Grecian architecture, that the wonder is it should never have been adopted before,—although it was perhaps hardly practicable before the use of cast-iron for roofs. Instead of being either flat or vaulted, the ceiling is here of precisely the same form as the external roof, being, in fact, identical with it, in like manner as the open timber ceilings of Gothic buildings, consequently, while there is no masking of any kind, greater loftiness is obtained than there otherwise would be. And as in the Gothic style roofs of that description are made to exhibit arches, curved and pendant beams, tracery, &c.; so here the pediment form is introduced *internally*, not merely in outline at each end, but in two intermediate pediments, whose architraves rest upon the massive piers which project from the walls, so as to divide the plan into three compartments, and thereby without interrupting the vista, serve to impart to it greater variety, to produce a succession of spaces, instead of merely a single one, and to break up what might have been rather disagreeble monotony and formality, had the busts been arranged in continued rows, from end to end. The pediments are therefore seen in perspective, one behind the other, and besides being otherwise embellished, their tympanums are divided into compartments filled with figures and arabesques, in open work. Here, then, Klenze has most felicitously solved an important problem, and without other authority than that supplied him by his own invention, has produced what will henceforth be an authority and standard for others to follow. What he has here done, may indeed be compared to Columbus' breaking the egg; for now that it *is* done, people may say that the idea was obvious enough: nevertheless, obvious as it may have been, it was beyond their grasp and reach. Such being the case, architects would do well to think a little more for themselves, than the generality of them now appear to do, and to consider whether there may not be other latent ideas to be seized hold of and brought out, applied and developed;—which, however, they are not likely to do, so long as they continue to look chiefly to precedents and authorities, without seeking to venture beyond them. We do not mean to say it is at all desirable that every one should attempt what is beyond the power of most to accomplish: let those who have no ideas of their own—of course we mean ideas of any value—stick to established precedents; but let not therefore those who are more gifted, who can penetrate into the resources of their art be deterred from exercising their originality, by the apprehension of being charged with innovation. The time was, when what is now authority and precedent, was innovation: without innovation, we should not have had the Ionic order in addition to the Doric, nor the Corinthian in addition to the Ionic. Does not Gothic architecture very forcibly display progressive innovation from first to last? and if, at last, invention seems to have been quite worn out, it was partly owing to accidental circumstances, and to the not pursuing any further the same course, guided by the same principles. But we are neglecting the Walhalla.

In combination with the ceiling, is the mode employed for admitting light, viz. through an open space (but filled in with plate glass) over the centre of each compartment; by which means, while many inconveniences are avoided, many positive advantages are secured. Windows in the walls would have been almost, or we may say, quite fatal to the exterior, for however managed, they would at once have destroyed the character and the effect of pycnostyle Doric colonnades. Even in the interior, side windows would have proved highly objectionable, if only on account of their producing cross lights, and too many separate spots of light, thereby destroying that breadth of light and shade, which so greatly contributes to the effect of architecture. A light admitted directly from above, is certainly that which the artist's eye most approves: it is that to which the preference is given for galleries and *studios*; nevertheless, architects in this country seem determined never to give it us, if they can possibly avoid doing so. As far as we are aware, not a single church professing to be in the classical style—whether Grecian or Roman—is so lighted—at least, only partially; notwithstanding that windows prove almost invariably blemishes, in what may be otherwise satisfactory in design. It would seem, that because windows are highly characteristic and ornamental features in churches in the Gothic style, they must be retained as matters of course in all churches, however ill they may accord with the style selected for them. Had the interior of the Walhalla been lighted by windows on its sides, very different and decidedly much inferior would the effect have been from what it now is; besides which, many of its embellishments would have been very indistinctly seen. Such would have been the case in regard to the magnificent frieze or relief, by Pettrich and Schopf, after Wagner's designs, which forms a line of sculpture beneath the entablature, extending altogether to about 300 feet. The order of the interior is Ionic, but only in antæ or pilasters at the angles of the piers between the divisions of the plan, except at the further or North end, where is an open screen—a distyle in antis, through which is seen a fourth division answering to the opisthodomus of an ancient temple. Over this Ionic order, there is another, of Caryatides, representing *Valkyriæ*, and these colossal female genii (ten feet high) are in imitation of the chryseo-elephantine statues of antiquity, the naked parts being made to resemble ivory, and the draperies blazoned with gold and colours. The busts, which

[5] Not to encumber the description with too many details of the kind, we here note some further particulars relative to the exterior of the building, which is nearly a fac-simile of the Parthenon, being not only of precisely the same order, but like that edifice an octastyle peripteral, and with the same number of columns on its flanks, viz., seventeen, including those at the angles, or 16 intercolumns. There are therefore 46 columns, or including six others forming the pronaos within the entrance portico, 52 in all. Measured along the bases of the columns the plan is 98 feet by 232, which dimensions are as nearly as may be those of the Parthenon.

at present amount to about eighty, or half the number proposed, are all uniform in size, and in the *Hermes* fashion; and in regard to them we may here endeavour to meet an objection likely to be made. That there should be no statues, but only busts, may at first strike as rather a strange circumstance, inasmuch as the latter may be thought somewhat insignificant, and merely accessory objects in comparison with the splendid building in which they are deposited. No doubt they are so, if considered individually, but certainly not, when considered collectively, for then they make a prodigious sum total, and their importance and interest become in keeping with the architecture around them. Certain it is that not one half of the same number of statues could have been properly arranged within the same space, and what is not least of all deserving consideration is, that by busts being adopted, one exceedingly great difficulty has been entirely got over, we mean that of costume. In this respect, some of the earlier figures might have proved suitable enough for sculpture, but then the later ones would have contrasted very disagreeably, not to say ridiculously, with them. So represented, would Mozart and Goëthe have seemed to have been of the same race, of the Germanic stock, as Otto der Grosse, and Friedrich der Rothbart? The sculptors employed upon the former would consequently have worked at a very great disadvantage compared with those who were favoured by the costume of the other figures, which, besides being more picturesque in itself, admits of being treated more freely. However skillfully managed, Goëthe's coat would have been in our eyes, merely the very prosaic outside of a great poetical intellect. In most, if not all of the modern statues there would have been too much of the tailor and frizeur, unless they had been put into "night-gown and slippers" *deshabille*. The Gordian knot which has hitherto caused so much perplexity, and given rise to such very opposite opinions in regard to the adoption of modern costume and sculpture, has therefore been on this occasion, if not unravelled, dexterously cut through.

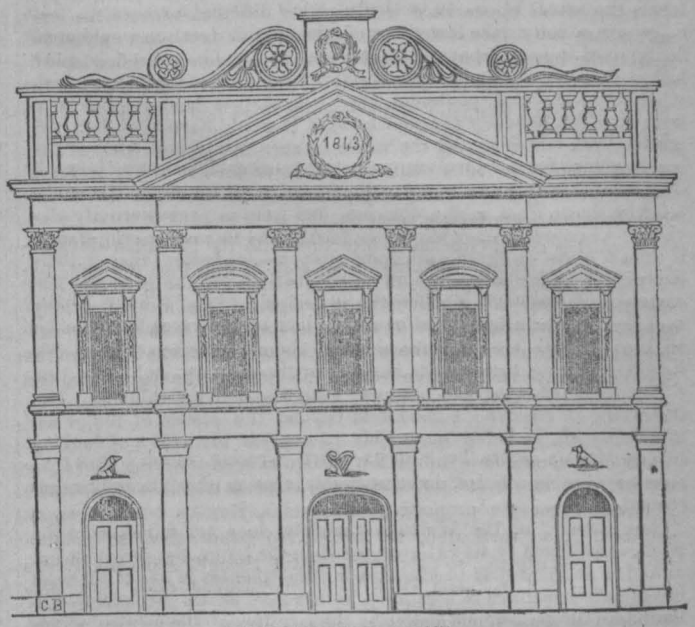
Another knotty point, however, there still remains,—at least, what has been made such by those who object to the Walhalla,—that its architectural character—noble as it is in itself—is quite at variance with the name and purpose of the building. These, they say, lead us to look for a monument in a very different style of the art—not Grecian, but Germanic. And as far as names and their influence go, this sounds well; but then if the objection is a natural one, it is so much so that it seems to have been adopted at once, without a second consideration being bestowed upon it, and as if it could not possibly be met by any counter-objection. It may fairly be questioned whether anything nearly equally satisfactory would have been produced in the Gothic style; for that is one in which the Germans of the present day have not been eminently successful. Besides which, not only would a Gothic structure upon the same scale, have appeared comparatively small and deficient in bulk and majesty, but would, in all probability, have borne too close a resemblance to a church, and have looked more like a building dedicated to religion, than to art. The applying any such form for a secular purpose, might therefore, have been construed into a desecration of it; whereas that of a Greek temple is not associated, in our minds, with any ideas of particular sanctity, nor does it excite other feelings of veneration than of those for art. Admitting that the Walhalla—that is, its exterior, is scarcely more than a repetition of the Parthenon, it is also the only one—that which alone of all the things pretending to be '*after*' the Parthenon, conveys an adequate impression of what the original was in its pristine state. Were the Athenian structure still perfect, it might have been a question if it was worth while to erect a duplicate of it elsewhere, and for a very different purpose. Yet such is not the case; neither is the Walhalla a mere copy of it, and no more; because while it is so far a truthful copy of it as to exhibit the grandeur derived from loftiness of site, this last circumstance is here treated more architecturally, the ascent up to the building being immediately combined with it, and made a very principal and striking portion of the entire composition.

We have now dwelt so long upon the subject of the Walhalla, nevertheless passing over much which we could have introduced into what we have said, that we have left ourselves no space for noticing other productions of German architecture, although some of them would furnish equal matter for remark, for description perhaps still more. Among them is the *Residenz* at Munich, a vast pile, forming not only a palace, but almost a cluster of palaces, comprising as it does the *Königsbau*, the *Festbau* (with a façade nearly 800 feet in extent), the *Allerheiligen-Capelle*, &c. Much, very much more, also, could we say on the subject of the Encyclopædia were we not here obliged to conclude. Which being the case, greatly as he dislikes German architecture, Mr. Gwilt has, upon this occasion, some reason to be satisfied with it, inasmuch as the notice we have bestowed upon it has diverted our attention from his own work. As it is, what we have said will at least serve to show what sort of matter and information he has thought fit to pass over, and likewise to prove that much as he may affect to despise "anonymous critics," and all who write for periodical publications, some of them are quite as much, if not more *au courant du jour* than himself, and certainly understand equally well what is now likely to be expected, both by the public and the profession, from a work styling itself "An Encyclopædia of Architecture."

OBSERVATIONS ON ARCHITECTS AND ARCHITECTURE

By Henry Fulton, M.D.

No. 4.



CONCILIATION HALL, DUBLIN.

Scale 10 feet to the inch.

1*st Clown.*—Who builds stronger than a mason, a shipwright or a carpenter?

* * * * * *

2*nd Clown.*—Marry now I cannot tell.

1*st Clown.*—Cudgel thy brains no more about it, for your dull ass will not mend his pace with beating; and when you are asked this question next, say a grave maker, for the houses that he makes last till doomsday.

Hamlet.

It is not to a grave maker that the inhabitants of Dublin are indebted for the design of the Conciliation Hall (intended as the place of meeting for the Repeal Parliament), else doubtless it would have been erected with more durable materials than brick and plaster, yet from certain curly-cues on the summit, such as frequently ornament the last portable receptacle of frail humanity, we may form a tolerably correct notion of the enterprising *undertaker* of the design. But far be it from me to insinuate that any calling or profession should debar a man from studying the noble science of architecture, I only impeach the judgment of those committees of selection who do not cause to be produced something more worthy their country and their age. It matters not to the public by whom produced, or whether the artist has or has not half the alphabet as a sequence to his name, provided the design does credit to his taste and to the discernment of his employers.

The architect has given us a pleasing variety of the emblems of war and peace in military cocked and opera hats above the windows, the warlike being in proportion to the peaceful as three is to two, and thus following the example of the façade of Antrim House in Merrion Square, erected for the late President of the late Royal Institute of the Architects of Ireland. Then we have a sham pediment, which does not mark the outline of the gable, but defines just nothing at all, as the ridge of the roof is on a level with the top moulding of the

pedestal which rises from its apex. On each side of this sham pediment we have a balustrade for no other purpose that I can see, unless to put balusters out of fashion, and if this be the object I sincerely wish it may be successful. It may be observed in this design, how effectually the balustrades and parapets swamp the pediment; which will afford a good study for those who admire the expedient of converting a real pediment into a sham one.

II. A writer under the signature of J. W. R., in the last number of this *Journal*, p. 416, objects to the proposal of making an Egyptian façade to the Museum, on the grounds that the style is not European. This line of argument is so like what my good old aunt Marabella would urge, that I trust I shall be excused, if mistaken, in assuming the signature J. W. R., to be that of a fair incognita, and reply, "Ah, ma'am, are you aware that the same geographical reason would apply against the introduction of the beloved congo on your breakfast table?" It is true the Museum is a *national* one, that is, national property, but the geographical character of its contents have only the limit of the globe itself. What J. W. R. says of a Gothic façade is quite incomprehensible, for I cannot suppose the existence of such a thing, the style depending upon the development of parts impossible to be brought into a mere façade.

Of what is *called* Grecian architecture with its Palladian deformities, we have enough. The Egyptian style is free from the polluting touch of Palladio or his school. In the one case we know what to expect; in the other hope opens a door in the unexplored field of Egyptian antiquities for the expectation of something better. The Greeks are supposed to have learned the art from the Egyptians, and why may not we? if the like success shall attend our exertions, great will be our reward.

Oh, Madam, there be edifices called Grecian, which I have seen, and heard others praise, and that highly, that neither having the form of Grecian, nor the proportion of Grecian, Roman, nor Gothic, so pedimented, so rusticated, so bustled, so balustraded, so polytriglyphed, so distorted, so perverted, that I thought some architect's journeyman had designed them, and not designed them well, they imitated the style so abominably. But I would recommend to you, ma'am, and the Palladians, an attentive perusal of the entire charge, of part of which the foregoing is a parody, it is as applicable to architecture as to the drama—to Sir Robert Smirke as to Hecuba.

III. Although the exterior of the Roman Pantheon, with the exception of the noble portico, is an unsightly mass, yet it affords an important lesson worthy the consideration of us moderns. Where (it may be asked) is the architect who could make anything of it in the way of ornament? Or who could design an edifice of the same form and dimensions, in the Greek or Roman styles at least, and make it at all ornate without being at the same time absurd? This, it would appear, was the feeling of its architect, and hence, with the exception of the portico, all ornament was reserved for the interior, which, for beauty, when restored in imagination to its pristine state, far surpasses the interior of any edifice in the world, unless it be some of the Gothic cathedrals, if things so dissimilar may be compared. Might it not be well in all cases where, from the required interior accommodation the exterior cannot be made in good taste, to follow the example of the Pantheon and leave it unornamented? this would tend to save the credit of the architect, the purse of the employer, and the feelings of amateur critics. The beauty of the portico forbids us to suppose that it was a lack either of taste or talent which caused the tambour to be left as we see it: perhaps it was the intention to hide it by other separate and distinct buildings, for no means of internal communication were left in the plan to favour the idea of some antiquarians, that it was intended as a hall appertaining to the baths of M. Agrippa. It need scarcely be remarked that the two excrescences, which rise like asses' ears behind the pediment of the portico, are modern.

[2] See interior of the new Exchange.

A RECENT GLANCE AT THE WORKS AND THE GEOLOGY OF THE SOUTH-EASTERN RAILWAY.

THE travelling on the Croydon Railway is very smooth and agreeable, an effect which, I understand, is due to the system of construction adopted for the permanent way. The rails on this line are laid upon longitudinal sleepers, which are placed in a continuous uninterrupted line under each rail. The train has, therefore, an equal and uniform support at every point, and is not subject to the jolting motion which is experienced on many other railways.

The Croydon Railway, I need scarcely say, is used in common by the trains of the South-Eastern and the Brighton Railways, both of which approach the metropolis by means of this line, which may, therefore, be considered as the *trunk* for the south-east of England. The country adjoining the Croydon Railway between the Forest Hill summit and Croydon is delightful. The railway is flanked by several noble woods, the property of Lord Dartmouth and Lord St. Germain, and the whole country is studded over with innumerable pleasant cottages and villas, most of which command an extensive prospect from the elevated position which they occupy. The Croydon Canal, which was formerly a favourite resort of the angler and a famous place for boating parties and water frolics, for which, indeed, it was more distinguished than for any commercial benefits which it ever realized, has been quite forced out of existence by the railway. Some part of the canal has been filled up, its bridges pulled down, and its locks dismantled, while in other parts, the railway actually passed in the same line, and the ancient bed of the canal was lowered in order to suit the convenience of the usurper. In a few places, however, as about Sydenham and Annerley, short lengths of the old canal still remain, and these having been stocked with fish by the proprietors of the neighbouring taverns, are still frequented by many metropolitan anglers whose occupations do not afford them time for a sojourn at any more distant fishing station.

We left New Cross at a quarter before 10 and arrived at Croydon just a quarter past. About half a mile nearer London than the joint station of the South-Eastern and Brighton lines, the Croydon Railway turns off to the right towards its own station north of the town. At Croydon we enter upon the Brighton Railway, which is used by the Dover Company as far as Merstham, where the South-Eastern line branches off. Shortly beyond Croydon there is an interesting section for geologists, in a deep cutting where the Brighton Railway passes through the lower sands of the plastic clay formation. This sand reposes immediately upon the chalk, the junction with the latter being exposed in the cutting. After leaving this cutting, which occurs at Coombe Hill, just south of Croydon, the line enters the chalk district of the Surrey Downs. This is a gradually rising tract of country from Croydon to the summit of the chalk range at Merstham. The surface of the chalk is varied by numerous alternate valleys and ridges, the former of which have been washed out by the mighty rush of some ancient ocean long before the earth was peopled by its present race of inhabitants. These valleys are, notwithstanding, quite dry at the present time, if we except that in which the intermittent stream called the Ravensbourne occasionally breaks out and flows for a few weeks. This chalk district is distinguished by a very light and shallow soil, and the land is much covered by flints. Except in some of the valleys the soil is much too shallow and porous for the growth of corn, and is, therefore, devoted to pasturage, the grass being very short, but of a sweet flavour, and well adapted for sheep like that of ordinary mountain districts. Few tracts are more difficult of improvement than one with a dry absorbent subsoil of chalk with a very shallow covering of mould. The clay and sand proper for mixture with such a soil for the object of improving its mechanical structure, have to be conveyed up hill from valleys which are already too low, and from which the earth can ill be spared out of any occasional excavations. Nevertheless, the judicious application of capital to the object of strengthening the soil and rendering it more retentive of moisture, would effect great improvements even in the most unproductive chalk districts.

Between Croydon and the Merstham tunnel there are several minor stations at which only the Brighton trains stop, those of the South-Eastern company making no stoppage till they arrive at the other end of the tunnel.

From Croydon to Merstham, at which place is the summit of the chalk country, the Brighton Railway rises all the way at the rate of 20 feet in a mile, and very heavy cuttings through the chalk have been found necessary to secure even this, which, in the language of engineering, is by no means a favourable gradient. Before entering the Merstham tunnel particularly, the cutting is very deep, and the sides of the excavation being nearly upright, have a very formidable

appearance, suggesting the idea of considerable danger, even from the fall of a very small mass of rock from the top of the cutting, should it happen to alight upon a passing train.

At Red Hill, which is about two miles south of the Merstham tunnel, the South-Eastern Railway diverges from the Brighton line by a short curve, which forms an arc of a circle one mile in diameter. The first work which attracts attention on the South-Eastern line is the great tunnel through the green-sand formation at Bletchingley 3¾ miles from the junction with the Brighton line. This tunnel is 1326 yards in length, and is built in the form of an ellipsis with a circular invert. The width of the tunnel in the widest part, namely, in the minor axis of the ellipse is 24 feet, its width at the invert is 22 feet 3 in., the versed sine of the invert is 3 feet, and the full vertical height of the tunnel is 25 feet, measured from the hollow of the invert to the crown of the arch. I take these dimensions from the report of General Pasley on the opening of the railway. In the neighbourhood of Bletchingley, and in the same range of sand hills as that of which Red Hill forms a part, are the famous Fullers' earth quarries at Nutfield. This mineral is extensively carried into the clothing districts of Yorkshire and the west of England, and is of great importance in the woollen manufacture.

It is worthy of notice that the first public railway constructed in the south of England, was that laid down from Wandsworth to Merstham, for the purpose of conveying the lime, firestone, and fuller's earth of Merstham, Gatton, and Nutfield, to Croydon and Wandsworth, from which places these minerals were sent by barges up the Thames and through the Croydon Canal. This ancient railway was called the Surrey iron tramroad, and was the work of Mr. Jessop a celebrated engineer, who designed it about the beginning of the present century. The minerals formerly carried by this tramroad are now conveyed by the Brighton Railway and by carts along the public road. The old tramway has been bought up by the Brighton Railway company, and all the iron and stone blocks sold off. The fullers' earth pits are highly interesting to geologists, and are well worth a visit from any one who has an hour to spare at Red Hill. The peculiar earth known by this name is a variety of clay possessing highly abstergent properties, which renders it of great value in the process of cleansing woollen cloths from grease and other impurities. Fullers' earth contains 53 per cent of silex, a larger proportion than most other clays, and is distinguished by a remarkable property of falling to pieces and readily passing into the state of impalpable mud on the addition of water. In consequence of this it is necessary to preserve it with great care from the injurious effects of rain, and the carts containing it are commonly covered with tarpaulin for this purpose. Some of the embankments on the Brighton Railway were partly composed of fullers' earth in a wet condition, and this material being soon reduced to a fluid state run out from its place in the embankment, which as a matter of course, gave way, and subsided to an alarming extent. The fullers' earth of Nutfield is of two kinds, the blue and yellow, the latter being esteemed the best. The pits contain great quantities of a semi-transparent massive spar, termed by mineralogists the ponderous earth or sulphate of *barytes*, (from *βαρος* weight.) Besides the Bletchingley tunnel there is another short tunnel 88 yards in length, just before coming to Tunbridge, and a succession of cuttings and embankments, some of which are of considerable extent. There are also several large viaducts over branches of the Medway in the neighbourhood of Tunbridge.

The strata between Bletchingley and Tunbridge belong to the weald clay formation, but at Tunbridge several of the cuttings present sections of the Forest series, thus proving the interesting fact that these latter strata encroach more upon the weald at this place than shown on Mr. Greenough's and other geological maps. The true weald clay is almost uniform in its appearance, consisting commonly of the blue or brown varieties, with occasionally a thin bed of imperfectly aggregated shelly limestone, whereas the Forest strata consist of numerous alternations of sand and sandstone, with beds of clay extremely various in thickness, separating the layers of rock from each other. This appearance, which is presented by the cuttings near Tunbridge cannot be mistaken for that of the weald clay, and hence ample reason appears to exist for examining into the accuracy of the geological maps of this district. The principal works between Tunbridge and Ashford are a deep cutting at Postern between that place and Headcorn, with several viaducts over the Teise and the Beult feeders of the Medway, and one over the Stour, which flows by Canterbury and falls into the sea at the Reculver. These viaducts are principally built of timber, by which, of course, their cost has been considerably diminished, although, at the same time, it must be borne in mind, that they will decay much more speedily, and probably prove not cheaper in the end than structures of masonry.

The stations on this line have also been designed with a strict view to economy. Those at Tunbridge and Ashford are of considerable size, the others consist of small wooden buildings stuccoed on the outside, lined on the inside with canvas, and painted or papered in a handsome manner. At each station there is a booking office on each side of the railway, and these offices are not opposite to each other, that intended for the down train being nearest to Dover, and that for the up trains nearest to London.

The permanent way on this line is constructed in a peculiar manner. The rails weigh about 71 lb. per lineal yard, and are fixed in chairs which are supported by transverse sleepers of timber. The chief peculiarity consists in the form of the sleepers, two of which are made by sawing a square log of Baltic fir diagonally through the middle, so that each sleeper is a triangle in section. These triangular sleepers are laid with the edge or vertex downwards, and the chair is bedded upon the flat upper surface. The advantages of this plan are said to comprise superior facilities for packing the sleepers so as to secure them from disturbance, at the same time that its economy is said to be greater than any other that has been tried. Considerable difficulty has been experienced in procuring ballast for the permanent way. This was originally supplied by the sand cutting at Red Hill, but the material used was of far too fine a quality, and is blown away in great quantities during windy weather. I hear that the company is now about either partially, or entirely, to re-ballast the line with gravel from Croydon, the expense of carriage by the railway being so small that they can afford to go all this distance for a superior material.

I have already said that the railway commences by a curve when it leaves the Brighton line, and with the exception of this curve the line may be considered straight all the way to Ashford, a distance of nearly forty-five miles from its junction with the Brighton Railway. Throughout this long distance, with the exception of the small protrusion of Forest strata at Tunbridge, the line lies entirely in the weald clay, which forms a flat belt of country about seven miles wide, rising to the north towards the sand range which accompanies the north Downs, and bounded on the south by the gradual slope of the Forest district, which assumes in central Kent an elevation of 600 or 800 feet. The weald thus lies in a valley between the sand range on the north and the Forest country on the south. It is everywhere covered by abundance of fine oak timber, which flourishes in such luxuriance upon the weald clay, that William Smith the geologist, who first traced the succession of strata in this part of England, adopted the name of the oak tree clay for this formation.

Whoever has paid any attention to the physical geography of this country must have been impressed by the important connection between the Wealden district and the surrounding barrier of chalk which everywhere accompanies it. A series of cold wet clays, remarkably adhesive and retentive of moisture, composes the subsoil of the Wealden country, a soil so mechanically constituted as to be almost incapable of cultivation without the action of frost or of some other agent capable of producing a mechanical division and separation of its adhesive particles. Just such an agent is quick lime, which being mixed with the stiff heavy clay, bursts and splits the clods into many pieces, and produces a soft mellow soil which is capable of being cultivated to great advantage. For many years it has been the practice of the best farmers in the wealds both of Kent and Sussex to transport large quantities of chalk either burnt in the state of quick lime, or in the native state of chalk, to be burnt on their own land, for the purpose of mixing with the soil. It is a well-known fact that lime is even carried to some parts of the weald, a distance of 20 miles or more over such execrable roads, that the cost of carriage alone must exceed 1*l.* per ton. Now mark the circumstances of the great extent of wealden clay through which the South-Eastern Railway passes. On one part of the line, namely, adjoining the great cutting and tunnel at Merstham, there is a million tons of chalk lying absolutely waste and useless, encumbering the land by its presence, and forming unsightly heaps of spoil by the side of the railway. Why is not this chalk burnt into lime and conveyed by the railway into the clay districts, where it would produce such obvious improvement? Chalk may be had in equal abundance from the southern extremity of the line at the works beyond Folkstone, so that the distance of carriage to no part of the clay district on the direct line would exceed 25 miles, and the cost at the ordinary charge for carrying lime would be about 8*s.* per ton for the whole distance. If the railway were employed in this service it would prove of incalculable advantage to the agriculturists of Kent, as it runs directly through the middle of the wealden district in its longest direction, and the carriage by wagon from the sides of the railway would not exceed four or five miles in the most unfavourable cases. I did not observe a single ton of lime on the railway when I passed over it, and I greatly fear that hitherto the agriculturists of this district have been grossly negligent of the advantages within their reach.

Besides the deficiency of lime to mix with the soil, there is another circumstance which seriously deteriorates the prosperity of this district. The various streams and rivers flowing through it, as the Stour, the Beult, and the Teise, with the various branches of the Medway, afford a drainage so little below the general surface of the country, that collateral drainage cuts would produce little or no advantage, as the water stands in all the water courses at a level so high as very injuriously to saturate the adjacent lands. Under these circumstances, embanked watercourses on a high level would be required to carry off the drainage water, which would consequently have to be pumped up by steam or other mechanical power. It will probably be long before the circumstances of the country will permit of such extensive measures in agricultural engineering being carried into effect, but the means pointed out of procuring lime for dressing the land are obviously within the reach of all, and it can be esteemed nothing less than criminal to neglect them.

The railway company is carrying on extensive works in connexion with the harbour of Folkstone. A splendid hotel has been erected close to the harbour for the accommodation of passengers to and from the Continent. An elegant and substantial brick viaduct is being built from the railway station outside the town down to the harbour, and this when completed will afford great accommodation for embarking and landing both passengers and goods. The harbour was formed many years since by the inhabitants of the town, who, in order to complete the works, were obliged to borrow money from the Exchequer Loan Commissioners; as the interest of this loan was not regularly paid, the harbour, like many other public works in similar circumstances, was seized by the Commissioners, it was lately sold to the South-Eastern Railway Company at a very low price. This bargain was no sooner closed than the company undertook extensive measures for the deepening and general improvement of the harbour. When it came into their possession vessels could only lie at one particular place inside the harbour, namely, alongside the western pier, there being no sufficient depth in other places, even at high water. From the numerous lines of temporary railway laid down from the harbour to the beach on the east side, the earth-wagons, and the horse runs erected at various places, it appears to be the intention of the company to deepen the whole area of the harbour, so as to give the same depth of water inside as there is upon the bar at the entrance. The area of the harbour is about 12 or 15 acres, and it is enclosed by sea walls of a peculiar construction, the stones being laid not in horizontal courses but at an angle of about 45°. All the courses regularly rake up at this angle from the base of the wall to the top, and the stones are pitched in dry without mortar, so that the sea is allowed free access through the numerous cavities in the wall. The stone of which the sea wall is built belongs to the green sand formation. It corresponds with the Kentish rag so extensively quarried in the neighbourhood of Boughton Malherbe, Sutton Valence, and other places in the northern part of the county. The stone is a very hard calcareous grit interspersed with numerous small specks of the peculiar mineral called silicate of iron, from the colour of which the formation takes its name. The stone is procured abundantly in the immediate neighbourhood of the harbour; indeed the beach hereabouts exposes the bare rock which pitches down at a considerable angle to the north. The action of the sea upon the rock is to tilt large masses of it up from its natural bed, and many huge blocks may be seen resting in this altered position which the violence of the waves has caused them to assume. It was probably from observing this natural fact, and finding that the rock on which the sea walls were to be founded, was already formed by nature into steps, which the new construction would most readily unite with if the stones were laid at an angle, that the peculiar method of building, I have referred to, was adopted in these works. The walls appear to stand remarkably well, and though during the recent gales immense mountains of shingle have been raised against the groin at the western entrance of the harbour, no damage appears to have been sustained by any of the walls. The blocks of stone are of very great area, some of them more than 100 square feet; but their thickness is not great, few of the beds being more than 8 or 9 inches in depth. The bar at the entrance of this harbour is quite dry at low water, and renders the entrance impracticable except for a few hours before and after high water.

I had intended to extend my observations to the yet unfinished works of the railway between Folkstone and Dover, but the whole of the day which I had at my command was so fully taken up at the former place, that I must defer an examination of the remaining part of the line until it is open to Dover, which I am informed will be in the course of a few weeks. H.

THE RAILWAYS' TERMINUS, LONDON BRIDGE.

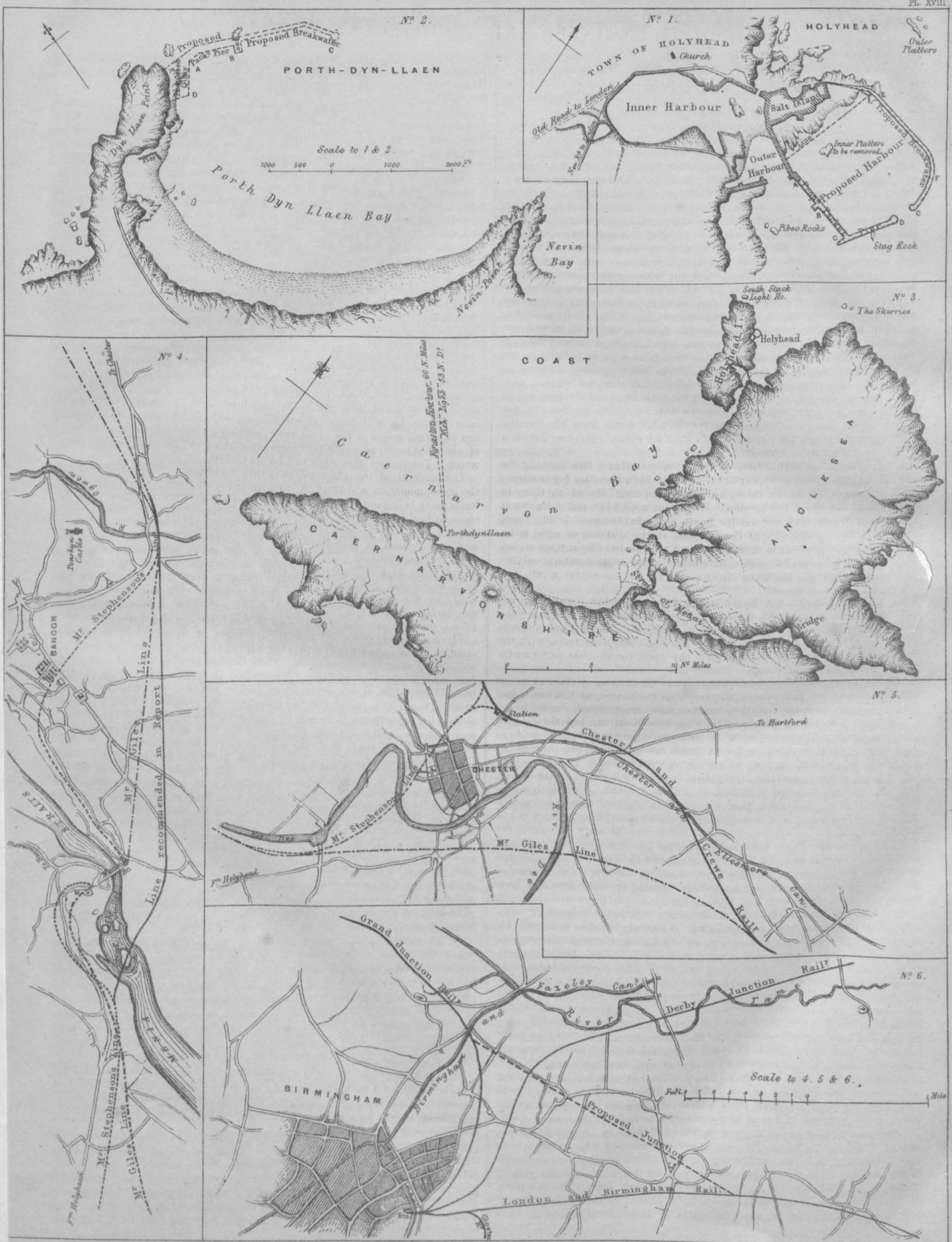
A STATEMENT having apeared in the *Journal* of the last month, relative to the building of the London Bridge Station of the Brighton, Croydon, Dover, and Greenwich Railways, which is calculated to mislead, in consequence of it not being exactly expressed in accordance with the facts; we therefore deem it right to state that the whole of the works of the three first-named companies have been under the joint direction of Messrs. Rastrick and Cubitt as Engineers, and of Mr. H. Roberts as architect and that Mr. Turner to whom especial reference has been made was employed at the recommendation of the "Joint Engineers and Architect," as "resident superintendent," and to prepare the drawings according to the directions received from them, which drawings were of course subject to their constant supervision and alteration. The façade building combining the offices of the Greenwich Railway Company was designed in conjunction with Mr. G. Smith the architect to that Company although the details were left more immediately under the direction of Mr. Roberts.

THE STEAM PLOUGH.

On Saturday, Dec. 9, we had the pleasure, says the *Dumfries Courier*, of seeing this truly remarkable machine in operation; and a more striking proof of what can be accomplished by human skill and perseverance can hardly be imagined. In the month of August last, a description of the machine was given in our columns, with a sketch of the improvements projected by Mr. W. J. Curtis, civil engineer (an old correspondent of this *Journal*); and these have been brought in the interim to such a state, that the plough is now in full working order. Those who have paid any attention to the subject are aware that the steam engine which drives the plough is contained in a wooden house, borne on the moss by two flexible endless bands or webs, formed of timber and fastened by bands of hoop iron. By this arrangement the great weight of the boiler, engine, and other apparatus, is distributed over a considerable surface, and the moss enabled to bear a pressure which, in ordinary circumstances, would force it to sink. By the application of wheels and moveable railway bars, on a principle formerly explained, the engine house can be conveyed along at a slow rate, moving in curves; and indeed since the date alluded to, it has been removed to a part of the moss nearly a quarter of a mile distance from its original situation.

The prevalent belief on the subject is that the plough travels on the moss propelled by the engine in the same manner as a locomotive on a railway. This is not the case, however; the engine remains stationary (or at least comparatively so), while the plough is propelled on the principle of the endless rope, somewhat akin to what may be seen at the stations of the Liverpool and Manchester, or Edinburgh and Dalkeith railways, where trains ascend and descend the adjoining tunnels by means of a stationary engine. In a right line opposite the engine-house, and at the distance of the furrows' length, there is a wooden framework on wheels, also moving on a moveable railway. It is betwixt these apparatus that the plough, detached alike from both, or at least only connected by the rope, moves along. The rope of great strength, being composed of wire twisted together, passes round two drums in front of the engine, and round a pulley in the centre of the wooden frame work. The plough is also connected with this rope, so that when the engine is put in operation, by which the drums revolve, the rope being coiled round one of them and off the other, impels the plough from the engine house towards the wooden frame work, which acts as a *point d'appui*. The plough is double in every respect, so that when the wooden frame work has been reached, or in other words the length of furrow completed, another furrow is formed by the plough returning to the engine house. The plough, be it distinctly understood, alone moves in forming the furrow, the engine and frame work merely requiring to be shifted the breadth of the furrow for each one which the plough forms in length; or to make a comparison with the common process, the engine moves along the head rig, while the plough goes up and down the field. In the plough itself the improvements made by Mr. Curtis are particularly conspicuous. The instrument consists simply of a share at either end moving on two small wheels, with a wooden framework below and an iron one above, which distribute the weight over a considerable surface. The steersman sits within, and by means of a novel invention, directs the course of the plough at pleasure; for, by turning a wheel, he coils or uncoils part of the rope upon a small drum attached to the machine, which brings the force of the engine to bear obliquely on either side desired, and guides the apparatus in the same manner as a ship is steered. A code of signals has also been established, by means of which the steersman can communicate with the individuals in charge of the engine and those stationed at the pulley framework, according as circumstances may require. One great step in this interesting experiment has now been made. The plough ploughs well and steadily, at the rate of between two and three miles an hour, turning over its huge furrow in a perfectly straight line, in a piece of moss where ho could not even stand, far less draw.

RAILWAY COMMUNICATION WITH IRELAND.



RAILWAY COMMUNICATION WITH IRELAND.

The Report of James Walker, Esq., C.E.

(Slightly Abridged, with an Engraving, Plate XVIII.)

To Sir John Barrow, Bart., Secretary to the Admiralty.

* * I now proceed in the order pointed out to me in your letter. First, to give my opinion of Holyhead for a packet station, and also for a harbour of refuge; these being two distinct questions. My instructions may be taken as having reference chiefly to the engineering part of the subject; but it was impossible for me to do justice to this, without extending my consideration out to sea, and even across the channel, and considering how the day and night beacons, the land-marks, and the shoals, affect the passage and the entrance into the harbour. I have, therefore, examined the charts and pursued the reports on this subject, particularly that of Sir James Gordon and Captain Beechy, which, with the observations on the petition of Mr. Ormsby Gore, and others, and the replies to these observations, together with the opinions of the various naval officers, including Lieutenant Sheringham, appear to me to have completely exhausted the naval part of the question, and must be well known to the Lords of the Admiralty, and all who have attended to the subject; so that very little need be said by me on that head. The natural advantages of Holyhead are described to consist of its being the nearest point of land to Dublin, being situated under a projecting and very conspicuous head-land, giving facilities for keeping out at sea in case of missing, or being unable to enter the harbour, the Skerries forming another good sea-mark, the entrance being free from bar, and the shelter which the bay affords to vessels from all winds, excepting between north-west and north-north-east.

Holyhead Harbour.—This bay, and the shallow estuary now forming the inner Holyhead harbour, appear always to have been a shelter for coasters; and the creation of a town there, before art had done almost anything to assist nature, confirms the opinion. It was not until 1715 that a light was shown upon the Skerries, nor was the South Stack lighted until 1809. These lights being one on each side of the harbour, at the distance of eight miles from each other, together with the pier, and the excellent light upon it, between the two outer leading lights, have much added to the natural advantages of Holyhead, and mark the direct course to, and the entrance into, the harbour in a superior manner.

The Stag Rock, which has now fifteen feet upon it at low water of spring tides, and the platters, which are within half a mile of the shore, are the only sunk rocks in the direct course of the entrance. There is one uninterrupted course, clear of shoals, between Holyhead and Kingstown, with the exception of the Burford Bank, which has upon the shoalest part two fathoms at low water spring tides.

The prominent disadvantages (within the "head") of Holyhead in its present state, as a harbour of refuge, are, that the bottom of the bay is bad holding ground, so that vessels at anchor there are exposed, during heavy northerly gales, to great danger of their anchors dragging, and their being driven upon the rocks, which, with some exception, encompass the bay; also, that from the pier pointing so much towards the shore, there is not room for a vessel to work in with a strong westerly, or to get out with an easterly wind, without danger of getting upon the rocks. I have not received a list of the losses and damage that have occurred. The depth alongside the pier for 300 feet is 10 feet at low water: this decreases rapidly, leaving but little space, even near the entrance, covered with water at low water of spring tides, and one half of the estuary or inner harbour is dry before half ebb.

As a harbour of refuge, therefore, Holyhead has at present but little pretensions, and yet it is much used by wind-bound coasters. I was informed by Captain Evans, the harbour-master, that during the three first months of this year, 394 vessels used the harbour for shelter, or being wind-bound or laid up.

As a mail-packet station, Holyhead has, even now, much to boast of. The certainty has indeed been extraordinary. Lieutenant Jones informed me that during the six years he has been on the station, there has been no instance of his packet, in the very worst weather, not having started so soon as the mail was on board, or of having put back after having started, or of being unable to enter after approaching the harbour. A few of the crossings have however been long. During the six years he has had one passage of 21 hours and two or three of eighteen hours. Commander Kaines also, the agent for all the packets, stated, that the Holyhead packets had never missed starting, and that they can make the passage at all weathers. Lieutenant Smail, of the *Zephyr*, said, that, excepting about six times in winter, during excessive gales, his longest time has been 7¾ hours, the quickest 5¾, and the average 6¾ hours. This information, added to the letters which are attached to Sir James Gordon and Captain Beechey's report, from the same, and from other officers who had left the station, is very strong as an argument in favour of Holyhead, in even its present state. *

I beg now to refer you to the accompanying design for improving and enlarging Holyhead harbour. It may be considered as of three divisions:—1st. A steam-packet pier, sufficient to give accommodation to the proposed larger packets. 2nd. A break-water pier, to form, upon a cheaper plan, a shelter to shipping from the northerly winds; and 3rd. The further extension of the landing-pier in the same direction as before, and returning the end over the Stag Rock, towards the termination of the breakwater, thus forming an inclosed harbour for refuge and the convenience of trade. Each of these stages may be considered an independent work, and would be useful without the other. The third or last division is a larger work.

Returning to the packet-pier (lettered A B on the design No. 1) its direction will be east-by-south nearly; its length 700 feet, and width 80 feet—both sides walled and faced with ashlar, as the north side will form also one side of the future harbour. The depth at low-water spring tides, at the inner end, 12 feet, and at the outer end, 18 feet. A return jetty of 100 feet is proposed at the outer end. The estimate of this division is £78,000.

Second. The breakwater (lettered E F G on the drawing No. 1) is designed to be carried out from the rocks at the north end of Salt Island, in an east-by-south straight direction 500 yards, and there returned by a curve to a southerly direction. Its termination or head will bear north-east-by-north of the Stag Rock, from which it will be distant 250 yards. This arm as will be seen by the plan, will shelter a large space (upwards of 70 acres) from all the heavy seas to which it is open. The low water depth, excepting for a very small space on the west side, will exceed 18 feet, the average being 24 feet. It will also protect the north side of the steam-packet pier, so that vessels may come alongside it. The estimate of this work, including the removal of the inner platters, is £177,000. These two works, therefore, amount to £255,000.

By the third division it is proposed to extend the packet pier 750 feet (from B to C on the drawing No. 1), and to project a jetty 150 feet to the southward. Thus the present pier, with the pier before described, and this extension, will form the south side of the harbour of refuge. A return in a north-east-by-north direction for a length of 900 feet (lettered C D on the drawing No. 1), will leave an entrance of 300 or 350 feet wide between it and the termination of the breakwater, making a complete harbour of refuge of about 80 acres, in which the large-class ships will be afloat at the lowest water. The cost of this work will be £145,000.

The amount of the three works is thus £400,000. When they are done the accommodation will be of the first order for steamers, the length of deep water quay being not less than 3900 feet, of which 2900 feet are within the inclosed harbour. There will also be an excellent harbour of refuge, which ships of the largest class may enter and leave with almost all winds, be always afloat, and in perfect safety while in the harbour. As I before said, each may be finished independently of the other, and each will be most useful after its kind, but not perfect as a whole, because the breakwater alone would not give such complete refuge as when made an inclosed harbour, by the completion of the third division. The two first divisions, amounting to £255,000, correspond nearly with what I have afterwards to submit for Porth-dyn-llaen, where an inclosed harbour is not proposed. *

Having already described the disadvantages of Holyhead in its present state, it is but justice to say now, that I think the works I have just described will almost entirely remove them. Thus, the bad holding ground outside the harbour will be of very little consequence, if vessels, by entering the harbour, have little or no occasion to anchor outside; and the same reason renders the rocks round the bay comparatively harmless. I am not aware that in my department there can be an objection to the plan but the expense; and as doubling the expense quadruples the area, and diminishes the swell, I consider that if made at all the harbour should be capacious. * * *

Porth-dyn-llaen Harbour.—Having thus given my opinion of Holyhead, with its capability of improvement, I have now to state the result of my observations upon Porth-dyn-llaen. Its present state may be considered as a state of nature, scarcely anything having been done to improve it; nor does it appear that any one connected with shipping has thought it his interest to settle or build near it for furnishing supplies to the vessels that may have frequented it. There is no shop or store of any kind nearer than Edern (one mile); nor is there the appearance of their having been one; a proof that if on occasions a great number of ships have taken advantage of the harbour, these occasions have not been frequent, or the ships must have remained a very short time. Yet this may not be conclusive against Porth-dyn-llaen having important natural facilities, for developing which a judicious application of science might do much. There are points in which I consider it has advantages. * * * *

In its present state there is nothing to recommend Porth-dyn-llaen as a station for packets. Everything would have to be done; and it cannot be denied that the elevation of the surrounding sandhills, which is 80 to 100 feet above high water, close to the sea, would cause considerable labour and expense to make convenient buildings, approaches, and communications. An example of this is given in the level at which Mr. Vignoles and Mr. Purdon, the engineers, have proposed to terminate the Porth-dyn-llaen Railway near the point, being 70 to 80 feet above the level of the sea at high water. This may be lowered, but the inclination would be increased.

Your instructions to me are, to prepare plans for a harbour, for a packet station, and for a refuge harbour at Porth-dyn-llaen, as well as at Holyhead, I have done so, and by enlarging Lieutenant Sheringham's chart, have to present a design for a pier and breakwater at Porth-dyn-llaen, drawn to the same scale as that for Holyhead.

Firstly.—For a packet station, the design proposes to form a pier from the east angle of Porth-dyn-llaen point to Carreg-y-chwislan (lettered A B on design No. 2), a length of about 300 yards, in an east-by-south direction, which is terminated by a return jetty upon Carreg-y-chwislan. This would give good length for steamers; the depth inside it, is ample. The width of the quay or pier, exclusive of parapet, is shown to be 50 feet. I have supposed a quay wall at the west end of the pier to be requisite for the purpose

of giving between it and the rock a site for buildings, and other conveniences necessary for connexion with the packets. This is drawn to go southward from the west end of the harbour wall, at A on the plan, and to extend to D, a length of nearly 200 yards. The amount of the works I have described to form this packet station is estimated at £120,000.

Secondly.—A harbour of refuge is supposed to be obtained by forming a sloping breakwater (from B to C on the plan) 600 yards in continuation of the pier. The area sheltered from the worst winds, and of which no part would have less than 12 feet water at low water, is about 100 acres, which from the apparent facility of procuring stone,[1] might be executed for about £90,000. Thus the engineering works for the packet harbour and refuge harbour would be £210,000, exclusive of all other buildings and accommodation, the expence of which would raise the total cost above that for all the works which I have designed for Holyhead, and then Porth-dyn-llaen would be more contracted in quay room, and inferior in other conveniences, but would have a larger deepwater harbour. * * *

The relative positions of Holyhead and Porth-dyn-llaen harbours, and the adjacent coast lighthouses, are shown on drawing No. 3. The advocates for Porth-dyn-llaen place in the foreground the objection that Holyhead is often in fog, and point to the excellent land mark afforded by the "rivels," and other high ground in the bay. The reply from the other side is, that there is deep water to the foot of the "head," which is often clear when the summit is in a fog; that it is the land-mark which is of all others best known, which a seaman coming into the channel generally attempts to make: that the rivels in Caernarvon Bay are not to be seen in foggy and thick weather until approaching them, when if a mistake has been made, it is difficult to correct it; and that the rivels at the bottom of the bay, are by no means equal to the head at the projecting point, as a land mark. * *

On referring to the objections to Holyhead, it may be noticed that they chiefly apply to the harbour as it is. Now, if the measures I have proposed would remedy these defects, which I think they would do, and render it nearly a perfect packet station and harbour of refuge, it is in this improved state that it should be compared with Porth-dyn-llaen in its improved state; for, in a national question of this kind, the true policy I take to be, to select what is capable of being made the best, and if there has been an error in hitherto using Holyhead, to proceed no further, but at once to adopt Porth-dyn-llaen. After, however, doing the best in my power in planning for both places, and supposing the land facilities equal, I have been unable to discover anything like sufficient grounds for preferring improved Porth-dyn-llaen to improved Holyhead for a packet station; I should say this if the sea distance were equal, which is not the case, Holyhead being nearer by six geographical or seven statute miles. Sir James Gordon and Captain Beechey state the virtual difference in making the passage, owing to the influence of the tides and to clear the kish sand, as several miles greater than the actual difference; and on the average of cases the fact will, as I have said before, be so.

If, then, Holyhead be the better station, independently of the town, the pier, the dock, the government yard, and the present land communication—all these come in to add to the weight of the arguments in its favour—I do not think it possible to have at Porth-dyn-llaen so convenient a site for a dock-yard establishment, as I have them upon the plan on west side of the proposed new harbour at Holyhead. For these purposes also, the nearer distance of Holyhead to Liverpool by sea, for the conveyance of materials, is a consideration.

Notwithstanding all this, a harbour at Porth-dyn-llaen, on the plan I have proposed, would be found very useful as a harbour of refuge for wind-bound vessels, or ships in distress, driven into or near to Caernarvon Bay, or going to Caernarvon, or to the Menai Straits for cargo, and waiting to cross the bar. * * * * * *

The Railway.—I have now to comply with the part of your instructions that has reference to the communication by railway from the two harbours, and, as I have already stated, this branch must be imperfect, from my not having yet received any plans of an inland or south line. To the coast line I have given considerable attention. Mr. Stephenson and Mr. Giles have each proposed a line from Chester to Holyhead, and each has been reported on in detail by Sir F. Smith, and Professor Barlow. I have marked upon the Ordnance sheets which will be delivered with this report, Mr. Stephenson's line by yellow, and Mr. Giles's by red lines. Nearly the same line was suggested, and is described by Mr. Vignoles, in his report of November, 1837, to the Commissioners for inquiring into the subject of railways in Ireland.

Both lines, after leaving Chester, follow the west shore of the estuary of the Dee, through Flint, pass under Holywell to Mostyn quay, go round inside the point of Air, thence straight to the south of Rhyl, and continue along the coast until within a few miles of Conway, when they proceed to the south side of Conway; after passing which, they again approach the coast, and continue along it to near Penrhyn Park, which they leave on the north or sea-side, and proceed through or near Bangor to the present Menai Bridge, after crossing which they leave the turnpike-road to get to the low ground on the south side of Anglesea, the greatest distance from the road being at two miles west of Mona, where they are 3½ miles to the south. From this point they again approach gradually the turnpike-road near Holyhead.

My decided opinion of the railway, as of the harbour, is that the best line should be selected: and that the railway should be made in a good manner as a great public work. I believe that the cheapest way might be to do the work well, even if the traffic expected upon it were for some time small; but I think the traffic upon this line will be great and increasing; indeed, that for all but the lowest class of passengers, it will be the general mode of conveyance from all parts of Ireland to England. The north of Ireland is the most out of its influence, and yet five hours between Belfast and London will be saved by going by the railway from Belfast to Dublin when completed, crossing to Holyhead, and then taking the railway to London. The case for the south and west of Ireland would, of course, be still stronger. Then there is the trade of passengers and goods to and from Holyhead, should the harbour be extended and used as I have referred to. It is a mistake, therefore, to suppose, that carrying the mails will be the principal business, or that the mail-trains will be the only trains. The Holyhead and Chester line, if this be the line finally adopted, may, when it has attained the same maturity, be nearly as good a line for trade as some of the lines which it will join now are; and that it will be at once a valuable tributary to all of them, cannot be doubted. I name the above, from seeing in Mr. Bidder's evidence on Mr. Stephenson's plan, that there has been a proposal of having only one line, with passing places; an expedient which may have a saving in the first cost to recommend it; but which the danger, the difficulty of repairing, the uncertainty, and the delay, ought much to outweigh. Also, in place of the very circuitous lines which have been proposed at Bangor, and the Menai Straits, and drawing the trains by horses, or by a fixed engine, up the slope and along the present bridge, which was built, and should be kept for a turnpike road, I think the line should be continued direct to the Straits, and the Straits crossed by an arched bridge built for the railway. The unfitness for a railway, of the present suspension-bridge, which is approached by a slope of 1 in 25; the interference by engines and trains with the present use of it, which interference will, I am sure, be more frequent and annoying than appears to have been contemplated; the delay at all times, and particularly in stormy weather; the having to cross Bangor with an embankment of 70 feet in the deepest part; the numerous curves to reach the bridge, and the repetition of similar curves on the Anglesea side, are all objectionable. I think neither the Holyhead road, nor the Menai bridge, should be injuriously interfered with. The district, and the traveller who does not wish to go at railway speed, ought not to be deprived of the facilities they have had upon the turnpike roads, which the change of fashion may make more used than they are at present, besides being some check upon tendency to monopoly and its effects. I have shown the circuitous line, and the more direct line recommended by me upon the accompanying plan (No. 4). The railway bridge may cross at the Swelly or Gorred Goch rocks. The position and width of the latter are taken from a survey by Mr. Vignoles; they are nearest the direct line. The late Mr. Rennie and Mr. Telford both proposed fixed bridges over the Straits; the cost was, I believe, the objection. The iron-work of bridges may now be done at half the cost, and the traffic will be very much greater than was then calculated upon.

I think Mr. Stephenson's plan[2] of terminating on the west, better than that of Mr. Giles, which takes the east side of Holyhead harbour. Mr. Giles' plan of leaving the Chester and Crewe line before reaching the city of Chester, is much to be preferred to Mr. Stephenson's, which passes to the west of the city, and turns back through it by curves and works of considerable difficulty. These, if not objectionable to the citizens, are of an expensive nature. The distance from Holyhead to London, and to all the principal towns, excepting Liverpool, is one mile shorter by Mr. Giles' than by Mr. Stephenson's plan here; and of all places, Liverpool is, from having the direct sea communication to Dublin, least interested in the question. By Mr. Giles' line there is one mile less of railway to make here. The accompanying plan (No. 5) shows the directions of the two lines near Chester. Short tunnels through the points of Penman Back and Penman Mawr will, in my opinion, be preferable, in respect of despatch and safety, to embanking outside the perpendicular cliffs, which are heavily struck by the seas. The gradients for both lines are unobjectionable. A very detailed and clear account of each line is given in Sir F. Smith's and Professor Barlow's report, which contains also a proof of the sufficiency, as a question of statistics, of the chains of the Menai Bridge to carry the railway trains. Mr. Stephenson's line, through Anglesea, is not so straight as Mr. Giles', but the difference in cost would, in some places, be greater than the advantage by the straightness; a medium course may be the best. Near the Menai and approaching Holyhead, Mr. Stephenson appears to keep unnecessarily near the road for the safety of travellers upon it.

I avoid troubling you with further details. If the Government be a party to any contract, the line as well as the terms will, no doubt, be settled with due reference to the public in the conveyance of passengers as well as mails. If the harbour works be done in a good manner at the public expense, the railway to it should correspond; whatever is expended in improving and enlarging the harbour will be beneficial to the railway by increasing the traffic upon it; and if the railway is to be made by a Joint-stock Company, there will, I apprehend, be no difficulty at present in obtaining offers from parties who would be ready, with the aid of a fair compensation for carrying the mails, to undertake the work upon a plan approved by the Government.

[1] I have not supposed any stone to be taken from the Porth-dyn-llaen Point, which it would be injudicious to do.

[2] If there is any inaccuracy in my statement of Mr. Stephenson's line, it must be ascribed in part to my not receiving from him any explanation of his line, beyond what the documents which he had previously sent in afforded me.

To have parties who are influential upon the present lines, so that the public convenience may be secured for the whole length, might be an advantage.

Working of the Railway.—As the survey of the inland line of railway is unfinished, I have not inquired into the working of the Great Western Railway, but I have into that of the London and Birmingham, and I have received every facility and attention in doing so from Mr. Glyn, the chairman, Mr. Creed and Mr. Bury, with an expression of readiness to consider liberally any suggestion that might be made. A few which I named, and will now state, were received in this spirit. Ten minutes are allowed for the first mile from Euston-square, on account of the stationary engine work; this is at the rate of six miles per hour; it may be done and often is done in less time, but the difference is lost at the first stoppage, as the train must wait its time there. Now it is agreed that the locomotive engine might go to the terminus and start at once. This would save five to seven minutes. In two hours after starting there is a stoppage of ten minutes at Wolverton, where refreshments are supplied and invitingly served; less than half the time would do for changing the engine. There is no similar stoppage between Liverpool and Birmingham, although Birmingham is nearly equi-distant from London and Liverpool. The arrangements near Birmingham are still more unnecessary and more tedious. Here the up and down trains are taken off the direct course to the Birmingham station, to a point which obliges the carriages to be turned round upon turn-plates; half an hour is usually allowed for this and for refreshments. These operations being finished, the train returns along a curve upon the Grand Junction Railway to the valley of the Tame. In addition to the stoppage, we have had $2\frac{1}{5}$ miles of unnecessary travelling, the straight line or base of the triangle being $2\frac{1}{2}$ miles, the two sides which are travelled $4\frac{3}{5}$ miles. I see no reason, except "the good of the houses," why the mail, or a traveller to Liverpool or Dublin, should be kept ten minutes at Wolverton, and then be carried two miles out of his way in two hours afterwards, to be refreshed for half an hour at Birmingham.[3] Delicate persons, requiring frequent and long stoppages, will have the opportunity of travelling by other than the mail trains. Between 8 o'clock P.M., when the mail coaches upon the road leave London, and the same hour next morning, no time is allowed but for changing horses. If a few minutes be taken at some one place, it has to be made up for on the road. This may be the other extreme, and insufficient; it is worse than having no stoppage, exceeding five minutes, between London and Holyhead. Even Birmingham, for the sake of conciliating which the Birmingham detour was made at the time, will, I think, agree, that its convenience would be answered by having the Birmingham carriages to detach from the train. The accompanying plan (No. 6) illustrates my remarks on the Birmingham detour. In justice to the Railway Companies themselves, and to such of their passengers as are desirous of "getting on," the cut ought to be made now. The Companies can afford it; I have had it surveyed. The execution would not be expensive, considering its importance. There are no buildings in the way. By the above plan, and the alterations lower down to which I have referred, the worst curves between London and Holyhead will be avoided, and the distance reduced nearly five miles.[4]

Speed.—Then as to speed. The London and Birmingham Company began very prudently at 18 miles per hour; the work was new to them; they rose to 20, then $22\frac{1}{2}$; the last return of their mail trains was $26\frac{1}{4}$. With the exception of their power being occasionally too small for their loads to ensure punctuality, their work has been regularly, safely, and creditably done, so far as I have observed or heard, and has progressed steadily; their concern has paid well, and they appear disposed to attend to what the public convenience requires of them. The present Great Western speed is 29. These include stoppages. There is, in my opinion, nothing in the difference of gage of the two railways to prevent the Birmingham and Grand Junction being as quick as the Great Western, if they would apply sufficient power. That the Directors think so, is evident, from their allowing a speed of 40 miles per hour to be run when the inclination is in favour. The Northern and Eastern return 36 miles as their speed exclusive of stoppages. My observations upon this railway, and part of the Brighton, and also the South Eastern, make the speed vary from 36 to 40, and occasionally 42. The Great Western is often 45; on special occasions, it is still more.

The following calculations of time and speed are meant to refer to the mail and fast trains only. I propose to show, that after the extension and improvements to which I have referred are made, the journey between London and Dublin may generally be made in about 14 hours, and that the answers to letters posted in the evening may be received by the morning delivery, after one day's interval. By the received measurements of the present railways, and of the Ordnance map from Chester to Holyhead, the distance between London and Holyhead, allowing for the straightening at Birmingham and other places, will be 267 miles, which, at 36 miles per hour, is 7 h. 25 min.

Add for one stoppage of 15′, two of 10′, two of 5′, and five of 4′	1	5
Makes between London and Holyhead stations .. .. or $31\frac{7}{17}$ miles per hour, including stoppages.	8	30
Allow for crossing to Kingston and reaching the Dublin Post Office	5	30
Is from Euston station to Post Office, Dublin	14	
Allow time in Dublin	5	
Journey back to Euston-square	14	
Making the journey from Euston-square to Dublin, and back to Euston-square	33 hours.	

According to this, if the train leave the Euston station at 8 30′[5] P.M., the present time for departure. The mail would be in Dublin Post Office at 10 30′ on the following morning; it would leave at 3 30′ in the afternoon, and arrive at Euston-square at 5 30′ next morning, being the present time for arrival there. Some modification may be required in the detail, but a very small allowance upon the present speed is required to justify the conclusion as being practicable. Whether the Great Western course will produce something still superior, remains to be shown when I have the materials for making the calculations; but to have taken the Birmingham and Grand Junction lines, without including the improvements of which they are capable, would have been unfair, as I think the Birmingham and Grand Junction companies will see it to be their interest to make these improvements, because, without them, the above results for the time of the mails between London and Dublin could not have been brought out.

I named having inspected the country between Bangor and Porth-dyn llaen, which has been surveyed by Mr. Vignoles and Mr. Purdon for a railway. A higher level near Penryhn Castle must be kept to accommodate this line; but, after getting through the hill above Bangor, which, according to my opinion, the Holyhead as well as the Porth-dyn-llaen line should encounter, there is no difficult feature for a great length. The line keeps within a short distance of the turnpike road which skirts the Menai Straits an dCaernarvon Bay, except near Caernarvon, which it passes $1\frac{1}{4}$ mile east of the town. The country is favourable, very much more so indeed than its vicinity to mountains would have led me to expect. The only difficulty of a formidable nature is the Rivel mountain, which the engineers manage by keeping close to the shore, where the mountain is so narrow that only two short tunnels, together one mile in length, are required. There is also a deep and difficult cutting west of the Rivels, two-thirds of a mile long, through rock. The greatest inclination is 1 in 400. The length from Bangor to Porth-dyn-llaen is four miles greater than to Holyhead, but of the two, I consider that to Porth-dyn-llaen the easier; and if an inland line to Holyhead, whether through Worcester or Shrewsbury, can be shown, which shall be as good as by far the greater portion of the Bangor to Porth-dyn-llaen line, it will be superior to the coast line, which has some heavy rock in parts, and which, in some places upon the coast, will be much exposed to storms.

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[3] There is no Post-office arrangement requiring so great a delay.

[4] The line that was projected from Stone to Rugby would save 7 miles, by making 60 miles of railroad.

[5] All Greenwich time. Dublin time is 25′ 22″ later. Much confusion and disappointment would be prevented by the clocks in the United Kingdom being all kept to Greenwich time; the true time for astronomical purposes might also be shown upon the dial.

GILDING AND SILVERING BY IMMERSION.

THE following new methods of gilding and silvering by immersion have been adopted on the Continent. Their easy execution puts them within the reach of persons who have hitherto been strangers to this kind of operation.

Gilding on Silver.—Silver is gilt very readily by means of neutral chloride of gold added to a solution of sulpho-cyanide of potassium till the precipitate formed at first is redissolved. It is necessary that this liquid should preserve a slightly acid reaction, and if it has lost it by too great an addition of sulpho-cyanide, it must be rendered so by adding a few drops of hydro-chloric acid. In order to gild, the silver is plunged into this liquid nearly boiling and tolerably concentrated, in which state it is kept by pouring, from time to time, some hot water to replace that which has evaporated. In this manner, inconveniences which would result from too great concentration of the acid, is avoided, whose pressure is, nevertheless, useful to oppose the formation of an auriferous precipitate which takes place by elevation of temperature, when alkali predominates.

To Gild and Silver on Copper, Brass, and Bronze.—The solution of the cyanide of gold or silver has been already pointed out for silvering and gilding under the influence of electric forces, but it has been found that the same solutions, brought to a temperature near their point of ebullition, can also gild and silver by dipping. With regard to their preparation, if it were necessary to obtain them chemically pure, it would be expensive, without any advantage being obtained; the operation can be simplified and rendered much less expensive, by adding directly, either to the chloride of gold, or to the nitrate of silver, neutral, the cyanide of potassium in excess, so as to obtain the soluble double cyanides.

Silver cannot be gilt by this method, but as has already been stated, the sulpho-cyanide of gold and potassium gilds this metal very well.

The solution of the cyanide of copper in the cyanide of potassium, will not copper silver, even in contact with zinc; however, it will copper this latter metal in a very solid and perfect manner.

It must, however, be stated, that these processes, though so very convenient, because they always succeed and require but a few minutes for their preparation, deposit, unfortunately, but a very thin coating of the precipitated metal. This is an inconvenience common to all methods of coating by simple immersion.

ON VENTILATION OF SHIPS.

Suggestions for the better Ventilation of Sailing and Steam Vessels. By ROBERT RITCHIE, Esq., F.R.S.S.A., &c., C.E., Edinburgh.

(Abridged from a paper read before the Royal Scottish Society of Arts, April 10th 1843, and reported in their Transactions. Illustrated by Diagrams and Models.)

THE commencement of the paper is occupied with a history of the various contrivances and means proposed for ventilating ships from the year 1741 to the present time.

The failure, however, of so many ingenious schemes, extending over so many years, for improving successfully the ventilation of ships, has tended very strongly to impress me with the idea, that any method to be extensively useful, especially as regards sailing-vessels, must enter into the original construction of ships. And with this view I would suggest the introduction into timber and iron-built ships, of a thorough and efficient system of spontaneous or self-acting ventilation, affording at all times an ample supply of fresh air in every part of a ship, by means of a judicious arrangement of air-flues in the former, and pipes in the latter. In a large class of vessels ow afloat, by application of the openings or interstices between the timbers (presently in use for airing the frame-work) where the plan of close timbers has not yet been adopted, a free circulation of air might be effected at all times in lower-decks and cabins. As regards the airing of the frame-work itself, its importance has long been a point of much interest for the preservation of the parts below the surface, though much difference of opinion among practical men is entertained on this point, one class advocating a free circulation of air about the timbers, and another the exclusion of air.[1] In a communication to the Royal Society of London in 1820, by Sir Robert Seppings, F.R.S., when giving suggestions for a new principle of construction of ships for the mercantile navy, he alludes to the ventilators of Dr. Hales, and the utility of general ventilation, but attaches importance to the exclusion of atmospheric air for the preservation of the frame-work, though he was not inattentive to the value of admitting air to the interior of ships. Another view is taken of this subject in the able treatise on ship-building in the *Encyclopædia Brittannica*, where the suggestion is made that the preservation of the timbers might be assisted by adopting the openings between the timbers themselves, for the purpose of circulating air about them; and it is stated that, in the year 1827, the author had proposed this plan to the Admiralty. This opinion strengthens the view I entertain of the practicability of combining in a very simple way the general ventilation of the ship, with due attention to the ventilation of the frame-work.

The defect at present in airing the frame, where the interstices of timbers are made use of, arises from the difficulty of obtaining a current or circulation, from the inlet for the air being placed between decks, and no outlet being provided. But were it so contrived as to allow at all times a free current of external air by points of ingress and egress, the effect would be very different. It seems often overlooked, but there is no point more important to be attended to in spontaneous ventilation, than that where openings are provided for the escape of impure air, others must also be provided for the supply of fresh air, and *vice versa*. It must not be forgotten that air, like other fluids, can only fill a given space, or, as one of the earliest writers remarks, "that unless openings are properly adapted to suffer air to pass freely through, the external air proves a stopper to the internal, and only mixes with the next in contact." The same law which regulates the effect of currents in natural caverns, and which has been successfully applied to the ventilation of mines, will apply with equal force here. We know that the air in a well remains stagnant and pent up; but as has been remarked,[2] if two wells or shafts are sunk at a given distance from each other, and a horizontal passage cut from the bottom of one well to the other, so soon as the communication is made, there will be a tendency in the air to descend one shaft and ascend the other, whenever the temperature of the external air varied from that below. Applying the principle to the general ventilation of ships, there is nothing to prevent the converting of the open spaces between the timbers or ribs, into fresh or foul air flues or conduits. One series of these being arranged to convey down pure air—not to be taken from below, but from above the upper deck—to points of discharge at the floors of the gun and orlop decks, cabin-floors, or wherever requisite, and another series of openings *entirely separated from the first*, to commence at the beams or ceilings of these respective places, and pass upward above decks as high as convenient, for the escape of the foul or vitiated air. The points of ingress or egress for the air between decks may be in the form of a horizontal slit covered with perforated sheet copper or zinc, to break the force of the current. The points of inlet and outlet for the air above deck might have their effect increased, by having the orifices so arranged, that, while protected from the weather, the former would open to, the latter from, the wind. A portion of the interstices of the timbers similarly arranged, communicating directly with the open air, could be made to circulate fresh air for the timbers of the ship: but the apertures for the ventilation requisite for crews and passengers, must have no communication with the former, so as to prevent the corrupt gases from the bilge entering the latter. Inconveniences may be experienced practically in having the air openings, as described, from the difficulty of constructing those on the upper-deck so as to keep out the water; but were the principle adopted and carried into practice, the skill and ingenuity of ship-builders would soon overcome any such slight obstacles. Ventilation cannot be attained unless fresh air is admitted from above.[3] When air is made to enter the openings between the timbers *below the hatches*, as is now done, it must be useless when the latter are put on, as must be obvious to the most cursory observer. Admit, however, the external air, as proposed, and whether hatches were secured down, or side-ports closed, in whatever state of weather, there would be pure air conveyed to the inmates below; and although in some cases this mode of ventilation might be imperfect, yet it possesses the advantage of being always in operation, requiring neither attention nor labour, nor incurring expense. To make it more complete in winter, the external air openings would require to be provided with means for regulation.

Were it necessary to attain a greater certainty of perfect ventilation, at all times and in all climates, recourse may then be had for increasing the circulation to the plan I have alluded to, of artificial suction by heat; and instead of allowing the foul air to escape upwards from the tubes or pipes, the air might be collected from these into one horizontal trunk, and conveyed to the galley.

In iron-built ships, and in all vessels where there are no interstices between the timbers or ribs, or where these cannot be made use of, iron, copper, lead, or zinc pipes may be substituted instead. Nor would the space these occupy form any obstruction or ground of objection, as the air-pipes could be made flat or square, keeping the line of the inner wall of the ship. By some such simple arrangements as these, I can hardly doubt very considerable improvements would be effected generally in the ventilation of ships, and the obstacles to the permanent use of any machine, however perfect, in sailing vessels, must make the view I here take of it more important. It can, however, only be brought about by ship-owners and others giving encouragement to the combination or incorporation of ventilating arrangements with the construction of ships, such as have in a similar way been successfully done in domestic and public buildings. (See observations by me on this subject, *Arch. Mag.*, July 1837.)

I do not wish, however, to be understood as inferring that even any such mode of spontaneous ventilation as could be incorporated with the frame-work of ships would prove at all times sufficient for the ventilation of an overcrowded vessel. The immense deterioration of atmospheric air, by 600 to 800 persons crowded into a small space, where the cubical contents bear no proportion to the cubic feet of air required for each person (10 cubic feet being considered as requisite per minute to afford a wholesome atmosphere), renders such arrangement next to hopeless without mechanical agency. So long as vessels are overcrowded, hardly any plan can be devised which can afford an adequate supply of fresh air to lower-decks during night; all that can be done, without artificial means, is to prevent positive injury to health, by affording a constant and uniform supply of fresh air below decks at all times, which surely is deserving of the most serious consideration.

In very crowded ships, such as troop-ships and others, whether any arrangements, such as alluded to, are provided or not, the wind-fan, as improved, could be advantageously made use of. Two or more of these machines, worked by hand, would speedily renovate the air of a lower deck, by means of flexible pipes communicating with different parts of the vessel; in emigrant ships, the passengers would, doubtless, very gladly work these machines for the sake of fresh air in warm latitudes.

Another ventilator could likewise be advantageously applied in many cases in sailing ships, namely, an exhausting pump, with a hose or pipe, on the principle of pumping out the foul air, or a condensing or force-pump to throw in atmospheric air, worked like the pump of a ship or fire-engine. One of the earliest recommendations of a pump for ventilating purposes noticed, is by Dr. Desagulier. He mentions in his experimental Phil., that in the year 1727, he brought before the Royal Society an attempt to show how damps or foul air may be drawn out of every sort of mine by an engine

[1] Captain Symmonds, Surveyor-General of Dock Yards, has, in a man of war now ready for launching at Woolwich, carried the timbers solid about as high as the lower gun ports. Mr. Lang, who is naval architect for the *Prince Albert*, 120 guns, now building, I am informed, does not intend carrying up the solid frame nearly so high.

[2] Letter of John Buddle, Northumberland, 1815.

[3] The advantage of conveying air directly downwards from the upper deck, has been recently fully established in the Apollo Troop Ship from China, (and one or two other instances,) whose merely small openings at the gunwales, with lids to shut down in wet weather, are made use of. How easily might this principle be extended, and rendered most efficient, as above described!

which he contrived. "The engine consists of a triple crank with three pumps, which both suck out and force in air by means of three regulators, and are alternately applied to drive air into, or draw it out from, any place assigned, through square wooden trunks which, being made of slit deal, and ten inches wide inside, are easily portable, and joined to one another without trouble."[4] Dr. D. illustrates his description with notices of several experiments. At every stroke, eleven cubic feet of air was driven in, or as many sucked out; if the axis of the cranks turn sixty times in a minute, one man in that time might change a whole cubic space of eight feet; and by his estimate, a man breaths a gallon, about 287 cubic inches, of air per minute, and a candle, six in the pound, will burn nearly as long in the same quantity. This agrees with modern calculations, at the lowest estimate—300 cubic inches are contaminated by a man per minute, although Tredgold and others take the quantity at 800 cubic inches, and a single candle alone at 300 cubic inches. These facts go far to prove the necessity of ventilation, and in experiments made on board ships' lower decks (Philosophical Transactions, Vol. 47), it is stated that a candle burned 67 grains in thirty minutes where there had been no ventilation for twenty-four hours; after six hours' ventilation, it burned 94½ grains in the same time. Combustion could barely be maintained in the former atmosphere.

If the utility and convenience of Dr. Desagulier's hand-pumps realized the description given of them, they might still be usefully employed in the ventilation of the lower parts of ships. Many other mechanical contrivances might be noticed. For instance, the double air force-pump, worked by two or four men, on the principle now in use for diving-bells, which is worked by a lever, upon a standard, on the plan of Dr. Hales' ventilator. Triewald's ventilator (page 383) was probably on this principle. It may also be noticed here that the success which attends forcing down air, into mines, by means of a fall of water, points out how the foul air, which accumulates in the well of a ship, might in a great measure be discharged by letting down to and pumping out fresh water from the well. As the use, however, of mechanical ventilators has been generally, and still may be, even when they are restored to, of temporary duration in sailing vessels, no doubt, chiefly from the want of a motive power, my object in directing attention to a thorough system of spontaneous ventilation has been to show that in my opinion it is most likely, if properly achieved, to be permanently useful.[5]

In steam-ships, however, there can exist no obstacle to the expelling of noxious air mechanically, or the application of a perfect system of mechanical or artificial ventilation, nor can there be any reason why they should not be properly ventilated. Yet I question much if anywhere an efficient system has been introduced. I have, indeed, observed of late years an attempt to introduce ventilation into the cabins of a few steamers by providing small iron pipes from the ceilings, passing upwards through the deck; but, unaccompanied as these usually are, with fresh air inlets from above they cannot prove efficient, and only tend, perhaps, to create annoyance; however the introduction of these acknowledges the necessity for ventilation being provided.

In the common arrangement of steam-ships conveying passengers, the sleeping births enter from the saloon or main cabin; hence it may be said that eating, drinking, and sleeping go on in the same apartment. The atmosphere from such causes soon becomes noxious, which is generally farther increased by what Mr. Dickens, in his American Notes, so strongly condemns, the red-hot sulphurous stove, the inconvenience of which is increased by passengers crowding round it. No wonder the air in such cabins and saloons is sickening and unpleasant for respiration. During the day, if the weather be fine and hatches open, matters may go on pretty well; but in bad weather, or during the night, the case is very different. If proper air conduits or pipes were provided to bring down an ample supply of *fresh* air from above, distributed at the floors or decks of every cabin and sleeping berth; and from the ceilings of the respective cabins, or vacant spaces between the beams, branch-pipes conveyed the vitiated air to one large trunk, which might be made with proper precaution to communicate with the chimney, the engine-boilers, or pass through a steam chest, or encircle the steam-pipe—a constant renewal of the entire air between decks would go on. The current might be checked and regulated by valves, working in a very simple manner, before entering the chimney. In winter, the comfort of the passengers might be materially increased were the air warmed before being discharged into the cabins—cold offensive currents would thus be avoided. It is singular that the same idea had occurred to Buchanan, when he wrote, in 1810, on heating by steam. "It is worthy of the consideration," he says, "of those acquainted with nautical affairs, how far it is applicable to ships, particularly to men-of-war." There is generally in steamers very little spare steam; but a very small portion would be requisite to warm the cabins; or hot water could even be more effectively employed. In this case, the external air, before entering the cabins, might pass through boxes or cases filled with iron or copper pipes heated with hot water or spare steam from the boiler; or the air itself might pass through the interstices of iron cases similarly heated, and then enter into the cabins through numerous small apertures. Thus warmth and the supply of fresh air could in winter be combined.

I have alluded to the wind-fan having been made use of to supply fresh air or cool the furnace-room, the power being taken from the paddle-shaft. The fan admits of easy extension to the general ventilation of the steamer.[6]

In some recent instances, ventilators, on the principle of the Archimedian screw, have been tried for this purpose. Ventilators or revolving fans, on this plan which I have seen, are stated to have long been in use in factories. In an extensive flax-mill in Yorkshire, a very powerful fan on the principle of the screw propeller, driven by steam power, has been most successfully adopted, and the plan there in use for imparting moisture to the air, is highly deserving of general application, and ought never to be overlooked in ventilating arrangements.

The importance of keeping the furnace-room cool is of great consequence, especially in warm climates, as the heat is injurious to the health—the cold air rushing to the furnace, falls like lead on the heads of the stokers. To remedy the over-heating, though it cannot prevent the draught, a plan, proposed by Mr. Holdsworih of Dartmouth, has recently been tried in the *Victoria and Albert*, Royal Steam Packet, of having the bulkheads of two plates of sheet-iron, and a stream of cold water kept constantly flowing between.

Another plan of ventilating, suitable for steam-ships, which the small space it occupies recommends, is the very ingenious method adopted by Mr. Oldham at the Bank of England, of forcing in fresh air, by an air-condensing pump, through the interstices of iron cases heated by steam, the power being taken from the steam-engine, as described in the *Civil Engineer's Journal*, March 1839. This plan gives both fresh air and a modification of its temperature.

Mr. Taylor's plan, described in the Transactions of the Society of Arts, London, 1810, of pumping out impure air from mines by an air-exhausting cylinder, likewise admits of application to steam-vessels. Mr. Taylor's engine discharged more than 200 gallons of air per minute.[7] The idea of a motive power to work ventilators is of very old standing. A plan is given in the Phil. Trans. 1758, of using the fire-engines at mines for this purpose.[8] Various other suggestions might be made to apply ventilation to steam-ships—even the suction from the motion of the paddle-wheels might be made subservient to this purpose; but it is superfluous to say more on what admits of so many ways of attainment.

It is unquestionable, that the same share of attention has not been paid to the advancement of ventilation, as to other branches of the arts and sciences. A wide field is therefore open for improvements. But to be successful, these things must not be left to chance; they must form part of the construction of ships and steamers, and the naval architect and ventilator, as has been well observed by Dr. Reid, "must work together."

While undue currents of cold air must be avoided—which are often troublesome, and must be injurious—ventilation, to be perfect, should be so arranged as to admit of being increased or diminished, according to the number of inmates. In our climate, in steamers, whether in coasting or long voyages, it would be of importance to have the power of raising the temperature of fresh air before admission to cabins; merely giving it, however, that slight degree of warmth that will not be injurious to its hygrometric condition. This would insure a larger volume of air being admitted. The plan is so easily attainable, that it might lead to the dispensing, in a great measure, with close arid stoves, so detrimental to the health in confined situations. It is remarked, that even Celsus, amongst the ancients, recommended large rooms for the sick, or a fire in the chimney to draw off bad air. Where fire-heat is made use of in cabins, it ought, if possible, to be in open fire grates. An ample exposition of the injurious effects of close stoves will be found in the *Architectural Magazine*, May 1838, p. 231, by Julius Jeffreys, Esq.

[4] The machine was cheaply made—the pumps of copper, and crank of iron.

[5] See "On conducting air by forced ventilation," &c., by the Marquis of Chabannes, London, 1818, and remarks on ditto, by J. Arnot.

[6] In September 1842, a patent was granted to Robert Hazard, of Clifton, near Bristol, for improvements in ventilating carriages and cabins of steamboats. He proposed to remove the vitiated air within a carriage by means of a fanner fixed at a convenient place, and set in motion by the revolution of the wheel, or by other motive-power. He does not specify how he intended to apply his fans to cabins, but as regards the application to the latter, there is little scope for novelty.—*Rep. of Arts*, May 1843.

[7] Mr. Taylor's plan consisted in attaching a pump of simple construction to a small fall of water of about 12 feet. Steam-power could be substituted for water.

[8] It was first proposed by Erasmus King, to have ventilators worked by the fire-engines of mines; and Mr. Fitzgerald, in 1758 (see Phil. Trans.), suggested an improved method of doing so. I have alluded to the similarity of mine-ventilation with that of ships; thus, by having a series of flexible pipes connected with a wind-engine, or an air-pump attached to a steam-engine, immense supplies of air might be driven in, or drawn out, where required.

It is important for nautical men to know the great value of fire-heat as a purifier of the air of lower decks and close places, in the estimation of many of the most experienced navigators and naval commanders: Cook and Nelson may be named.[9] How conspicuously the importance of sanatory regulations were illustrated in the remarkable voyage in 1773-75, of Captain Cook, who, during three years, out of 118 persons on board, lost four, and of these only one by sickness.[10] We have likewise several similar examples in the arctic and antarctic voyages. See Expeditions of 1821, 1824, and later ones, where the advantages of warmth combined with ventilation, are clearly shown.

A very simple contrivance might be found useful for purifying lower decks when unoccupied; a grate, formed like a circular basket, hung in gimbals, which, like a pendulum, has its point of rest in the perpendicular.

The value of lime and vinegar washings and fumigations in destroying the bad effects of impure air, did not escape the older philosophers.[11] The knowledge of these facts was of vast utility in the days of Howard. Professor Daniel, and other chemists, have, in these times, recommended the use of chlorine gas and chloride of lime for a similar purpose. In combination with ventilating arrangements in ships the value of such antidotes —especially where sickness prevails—should not be overlooked.

If we turn to the graphic pages of Smollett, we may at once perceive, by contrasting his description of a man-of-war with the inspection of one now-a-days, what great improvements have been made. But still, much is yet to be done in ship-ventilation generally throughout the world. The air, being invisible, deceives many a one, leading us to consider it pure, while it may be stagnant and corrupt; hence the necessity of impressing the admission of fresh air at all times, as we do light; and the absurd idea cannot be too soon exploded, of people enclosing themselves in an air-tight box or cabin. With improved means of ventilation of ships and steamers, the energies of all on board will be promoted. By inhaling pure air during night as well as day, in cold or warm climates, increased longevity will be attained, and, at all events, the general comfort improved; and as Britain has outstripped most nations in the application of steam-power to useful purposes. why should she not take the lead in cultivating those arts which the physiologist has proved to be essential to the advancement of the physical condition of mankind?

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[9] An excellent paper on this subject, written nearly a century back, will be found in the *Gent. Magazine*, on the method of Preserving the Health of Seamen in long cruizes and voyages, where ventilation and fumigation are strongly enforced. Vol. xvii., 1747-8.

[10] Naval History, 1773, p. 349.

[11] Dr. Stephen Hales made many experiments recorded in his Statical Essays, London, 1731, vol. i, with a view to clear the air from noxious vapours. He found nothing so efficacious as a solution of potash. He says, page 207, "Sal Tartar should be the best preservation against noxious vapours, as being a strong imbiber of sulphurous acid and watery vapour, as is also sea-salt." A solution of caustic alkali will take up fixed air as fast as it is produced.

The rapid absorption of ammonia by water, and the avidity of fresh lime for carbonic acid, point out the utility of water with lime recently dissolved in it, for neutralizing the effects of impure air, either by the use of frequent fresh lime-washings, or exposing, in shallow vessels, frequently stirred, solutions of fresh lime. In factories, the sulphate of lime or gypsum is in general use for the absorption of ammonia, or removing the smell of the soil-pipes.

DECORATION.—HOUSE-PAINTING.

[We wish to direct the especial attention of Architects to the following paper extracted from the *Athenæum;* it is a subject that we hae often intended to have taken in hand, but it is here treated with so much judgment that we safely leave it with our talented contemporary and trust that the papers will be speedily followed up by others as hinted at in the conclusion of the present article.]

THE British School of Painting is already distinguished as a school of colour, and we islanders are said to delight in full toned and positive colouring: a proposition we are not disposed to controvert, though it is rather puzzling to find satisfactory evidence of it at the present time. We do not see our public buildings, our churches, our places of assemblage for lay purposes, our private dwellings, our dress, or our furniture, generally animated with the fascinations of colours. Truth surely would compel us to admit, in spite of growing exceptions which might be quoted to the contrary, that we have little else but frigid white-washings and sombre neutral tintings in our buildings, and show little knowledge and appreciation of colour in the more mechanical productions of art. Yet in none of Nature's domains is she more bountiful in specimens of colour and its endless varieties, than in our country. During the revolution of a year, we are treated with blue skies rivalling those of Italy—(not frequently, perhaps, yet we *do* have them) and red fiery sunsets, not inferior in depth and intensity to those of Libya, and between these extremes, arising from the modification of light, we may collect every variety of cold colouring on the one hand, and warm on the other. The colouring of our vegetation too, is, of infinite diversity; and where is the clime that shows such delicate varieties in the colouring of complexions and eyes? Yet somehow, if we view the use and employment of colours at the present time, we cannot be said to be following up in our own works, the bountiful gifts and suggestions of Nature. Time was when we seemed in our practice more sensible of the influences of colour. The old Papistical Chapter of the metropolitan cathedral painted the walls of Old St. Paul's; whilst the new Protestant Chapter actually refused to receive paintings as a gift. Such remnants of Middle Age furniture as are preserved to us, indicate a much more extensive employment of bright colouring, than the furniture of our own time. Perhaps no very early specimens of the use of colouring in the interior of our domestic dwellings, can now be produced, yet as we know well, that the *outsides* of houses were hung on high days with brilliant tinted tapestry, we are surely justified in inferring, that the insides of houses had other tints than neutral ones. Even so near our times as the Commonwealth, our dress was far more coloured than it is now. It might be proved, that before the Reformation, English people delighted in strong and bright colours, and perhaps the temporary suppression of the taste (a suppression but temporary, though its duration has been so long) might be shown to have been owing to that event: we will not, however, discuss the point here. From some cause, it is certain, that we have ceased, for a long period, to use colours as much as we formerly did, and we may welcome that general revival in the employment of them which is assuredly taking place, and which first began to show itself markedly in pictures. It is, therefore, little matter for surprise, if we find in so subordinate an application of colouring as the decoration of our dwellings, either very little positive colouring, or very little knowledge or taste displayed in the employment of so much as we do find. In a paper on the subject of painting, in the *Edinburgh Encyclopædia*, the following remarks occur on the present state of House-Painting, very apposite to what we have here advanced:—

"With us, the practice is chiefly confined to that of a mere handicraft, where little refinement is sought for, beyond the simple usage of the painter's shop, the mixing up of colours and their smooth application to the wall. Whereas, in Italy, the study and acquirements of a house-painter are little inferior to what is requisite for the higher branches of the art; and, in fact, the practice of both is not unfrequently combined. They are more conversant with the science, as well as the practice, of colouring, with the rules of harmony and with the composition of ornamental painting in all its branches: so that their works might be transferred to canvass, and admired for their excellence. In fact, the great frescos of the first masters, which have been the admiration of ages, were but part of the general embellishment of the churches and palaces of Italy. And the most celebrated names in the list of artists, have left memorials of their fame in the humble decorations of the arabesque, in which all the exuberance and playfulness of fancy is displayed, as well as the most enchanting harmony of brilliant colours. It is in this essential point of harmony, that our practice is particularly defective; we rarely see, in the simple painting of our apartments, any combination of colours that is not in some part offensive against even the common rules of art; if there are any rules observed, save those of mere caprice or chance—although there are certain combinations pointed out by the laws of optics, which can as little be made to harmonize as two discordant notes in music. The unpleasant effects arising from such erroneous mixtures and juxtapositions, we are often sufficiently aware of, without having the skill requisite to assign the reason any more than the painter who chose them. This accounts for the prevalent use of neutral colours in our ornamental painting, which is less liable to offend by whatever bright colour it may be relieved, and likewise the safer and more agreeable combination of the different shades of the same indefinite colour. But no sooner do our painters attempt any combination of decided colours than they fail. The ornamental painting, in Italy, is almost entirely in decided colours of the most brilliant hue, and yet always inexpressibly pleasing in the combinations, because the rules of harmony are known and attended to. Neither is this proficiency confined to the decoration of palaces, or the more elaborate and expensive works; we have seen in dwellings of a much humbler cast, and indeed in general practice, the most graceful designs of ornament painted, not in the simple manner of Camayeu, but displaying every possible tint of bold and vivid colouring, and melting into each other with all the skill and harmony of a piece of brilliant music."

For our parts, we are disposed to believe harmonious colouring, consistently employed in the decoration of all buildings—inhabited buildings especially, where we spend a great part of our lives—not to be either slight or unimportant in its influence on the moral tone of the inhabitants. As we may read to some extent the character of individuals in their dress, so we believe we might do so in the character of their dwellings. Hence, a very dull-minded, tasteless people we may be pronounced to have been during the eighteenta century. A room of bright and cheerful appearance surely tends to dispel gloomy and melancholy associations, whilst a dark and dismal cell provokes them. Glitter and tawdriness disturb thoughtfulness, whilst quietude in colouring tends to suggest it.

"Experience," says Goethe, "teaches us that particular colours excite particular states of feeling." It is related of a witty Frenchman, "Il pretendoit que son ton de conversation avec Madame étoit changé depuis qu'elle avoit changé en cramoisi le meuble de son cabinet qui étoit bleu."

The great majority of domestic apartments at the present time, even in houses of the first class, have scarcely any marked features of decoration

about them which indicate taste or knowledge. They present a monotonous sameness and deficiency of any principles of taste,—the varieties of character which occur, from time to time, being regulated only by the caprices of fashion. Sometimes every room you enter is of one colour. In one of the most splendid of modern houses in the metropolis—we mean in Sutherland House—we have been especially struck with the monotony of white and profuse gilding, in the forms of the Louis Quinze period. Sometimes the rage is for warm shades of colouring, at others for cold, though the preponderating taste seems to take refuge in dull, characterless, neutral colouring. "People of refinement" to quote Goethe again) "have a disinclination to colours. This may be owing partly to weakness of sight, partly to the uncertainty of taste, which readily takes refuge in absolute negation." During one season salmon colour, as it is called, reigns supreme; then sage colour succeeds salmon; drab follows sage or slate; and then all varieties of crimson put out the drabs. Each is employed in its turn, without the slightest reference to any of the questions which should determine its appropriateness or otherwise. It is the same with ornamental patterns. One year you will find every drawing-room papered with patterns of flowers, another year scrolls will be all the rage. One year small patterns are correct—in the following large only can be tolerated; and whilst each fashion reigned, each was exclusively used. Crimson walls in south aspects, leaden coloured ones in north aspects. Small patterns applied to rooms large and small, and large patterns to rooms small and large. A like absence of any recognized principles is seen in the carpets and hangings. When crimson walls were oftenest seen, then was the call for drab and light-coloured carpets. More by luck, than anything else, it is now the fashion to have the carpets darker in colour than the walls. We may often enter a room which, preserving something of each shifting fashion of the few past years, exhibits a violation of every principle of harmonious decoration. Walls of a hot and positive colour in a room with a southern aspect—blue ceilings fuller of colour than the drab carpets, with curtains and hangings of scarlet—and perchance a huge sofa covered with black horse-hair. Not a single thing appropriate or consistent, but the whole a medley of unsuitableness.

Having watched this subject with interest for years, we have arrived at some conclusions which, we think, it may possibly be useful to submit to our readers, and we shall endeavour to do so, in such a shape, that they may be turned, perhaps, to some practical account. It appears to us, that certain principles of decoration may be laid down, which, if recognized and applied, would make our dwellings much more cheerful and comfortable; which might make them comparatively beautiful, not only without any additional cost, but would make the keep of them more economical, by rendering them, to a great degree, independent of the caprices of fashion. It is the absence of correct principles which causes decoration and furniture to be out of fashion—tiresome—palling to the eye, and subject to constant change,—whereas, what is really beautiful, being based on everlasting principles, is subject to no change. We think the greater part of the painting of a house might be a work to last for a life, with benefit even to journeyman painters, and infinite satisfaction to the house inhabitant. A truly melancholy suspension of comfort is the work of painting a house. Your whole little world so turned upside down, that it hardly rights itself before the work has to be done again. What a comfort it would be to undergo the penance only once in a life, instead of every seven years.

It seems to us quite a mistake—though a very common and popular one—to imagine that Beauty is necessarily costly in its production. Nothing could be cheaper in material or manufacture, than the earthenware pots of the ancient Etruscans, yet they have perfect and everlasting beauty in their forms. The preference of one colour to another, within a very wide range of colour, is not at all a thing of greater or lesser cost. So far from beauty being costly, it would more often happen that in a given number of existing specimens of decoration, the greater beauty and harmony would be obtained at a smaller cost of labour and material, than what are expended to produce ugliness and confusion. Take, at random, a dozen patterns of paper hangings of various colours and devices, and in the majority of them, we believe it could be shown, that their cost of production might be materially lessened, whilst their beauty should be greatly enhanced.

Before we proceed further in the discussion of any practical rules for colouring interiors of houses, we must find room to quote, from Mr. Hay's work on Decorative Painting, some of his statements of the principal defects which he has observed in internal decorations. A conviction that our practice is not what it ought to be, and a humble recognition that there may exist rules for our guidance, though we may not be cognizant of them, are the first steps in amendment. The popularity of Mr. Hay's excellent work renders any further commendation on our part superfluous, and its arrival at a fourth edition affords a good sign of increasing attention to the subject. We wish it had been somewhat more specific and practical in its details for general use. It is essentially a work of principles. Mr. Hay considers the first and most obvious defect to be when there is no particular tone or key fixed on for the colouring of an apartment; "that is, when one part of the furniture is chosen without any reference to the rest, and the painting done without any reference to the furniture. This generally produces an incongruous mixture." The reader will understand what is meant by "tone or key" by what follows.

The "tone or key is generally fixed by the choice of the furniture; for as the furniture of a room may be considered in regard to colouring in the same light as the principal figures in a picture, the general tone must depend upon the *colours* of which it is composed; for instance if the prevailing colour be blue, grey, cool green, or lilac, the general *tone* must be *cool;* but if, on the other hand, it is red, orange, brown, yellow, or a warm tint of green, the tone must be warm." We may give an example of the principles here insisted on. The important masses of colour, independent of those on walls in most rooms, are furnished by the carpet, the covering of the sofa, chairs, &c., the draperies of the curtains, and the covering of the tables. The colours of all these are too frequently chosen without any reference one to the other. If the colour of the furniture be light *blue*, then it would be bad taste to colour the walls *crimson*, or select a carpet with any amber colour or much warm brown colour in it. There is a very apt illustration of this in a drawing-room in the Reform Club, which we have noticed for another purpose below. So with the objects *vice versâ*. The blue furniture might fitly be surrounded with any colour in which its own colour predominated, or even with a lemon colour—full toned or light in degree according to the tone of the *key (i. e.* the *blue)* colour. Mr. Hay's advice is perfectly sound in this case; and, as a case often occurs, where the decoration has to be adapted to furniture already existing, it is wise to lay down the proper principle for its mode of treatment. But it must not hence be inferred that furniture of any colour may be chosen at random, and then the decorative colouring of the apartment suited to it. In cases where both the furniture and decoration are to be newly provided, where the whole department of decoration is to begin *ab initio*, then the choice of colours for all objects should be determined upon principles mutually applicable to all. In such cases (of which we shall have to speak hereafter), the tone of the general colouring should be fixed with reference to much broader principles than any one dependent merely on the accidental colouring of the furniture.

"A second and more common fault," proceeds Mr. Hay, "is the predominance of some bright and intense colour either upon the walls or floor. It is evident that the predominance of a bright and overpowering colour upon so large a space as the floor or wall of a room, must injure the effect of the finest furniture." Very often indeed do we meet with illustrations of this fault. Look over half the paper-hangings in London, and it is most palpable in them. Nothing more common than to find a paper with a cool leaden-coloured ground or surface covered over with staring bright yellow scrolls. It is a defect no less prevalent in carpets, which are everywhere to be seen strewn with flower-patterns, Louis Quatorze scrolls, and affected imitations of forms manifested in intense brightness. "A third error is introducing deep and pale colours, which may have been well enough chosen in regard to their hues, but whose particular degrees of strength or tint have not been attended to. Thus the intensity of one or more may so affect those which they were intended to balance and relieve, as to give them a faded and unfinished appearance. This may proceed from applying the fundamental laws without any regard to the minutiæ; for although it is always necessary to subdue and neutralize such colours as are introduced in large quantities, yet when they are reduced by dilution alone the effect cannot be good. This error is also very common in the colouring of carpets and paper-hangings. In such productions the degree of intensity of the individual colours is seldom taken into account. A pale tint of blue is often introduced as an equivalent to the richest orange colour, and sometimes a small portion of lilac—one of the lightest tints of purple—as a balancing colour to a quantity of the most intense yellow. This is inverting the natural order of colours altogether. Every one may understand by this, that if it is desired to contrast effectively one colour with another—say a crimson with green—if one is deep toned or dark, so should be the other."

Having thus briefly stated what appear to be the most obvious defects of the present modes of coloured decoration in our domestic residences, we shall submit some hints for the consideration of any of our readers who may contemplate employing the House Painter and Decorator. We must however premise, that in treating a subject like the present, the absence of positive and practical illustration places us under much disadvantage. To illustrate fully the force of our observations, this paper should be read hand in hand with specimens of colours. The house-painter, states Mr. Hay, "must take into consideration not only the style of architecture, the situation, whether in town or country, but the very rays by which each apartment is lighted, whether they proceed directly from the sun or are merely reflected from the northern sky." Without undervaluing the importance of attending to the architecture and situation, it appears to us that Mr. Hay places that consideration which has the greatest weight last in order—namely that which depends on the aspect of the room to be coloured. To us it appears, after bearing in mind the nature and characteristics of the climate, that the first question to be asked before commencing any work of internal decoration is, What is the

Aspect

of the room to be decorated? In considering *Climate*, Nature herself seems to offer us abundant analogies for our guidance. In countries where light is least abundant, there the objects of nature have the least dark colouring. Near the North Pole, where the darkness of night is almost perpetual, nature clothes the ground and animals in snowy whiteness. In the regions of the Tropics, where the light is strongest, the deepest colours, approaching to black, are most frequent. In countries advanced in art, where the light is abundant and powerful, we find the greatest employment made of deep-toned colouring. The ancients, in brightly lighted countries, as at Pompeii, were accustomed to paint large surfaces of their interior habitations positive blacks. In those cases where we find such examples, the rooms were entirely open above to the heavens, and the supply of light was altogether un-

interrupted. In a climate like that of any part of Great Britain, we should never dream of covering large surfaces with black or even with very dark blue, or purple, and scarcely with very deep crimson, unless under peculiar circumstances. During three-fifths of the year, the light in our country is subject to constant obscuration. We therefore say, as a general rule, let the colouring be light. We do not mean to exclude the judicious use of any positive strong colours, or even of black itself, which may be employed most successfully in details, but we contend that the first general impression of rooms in England should be light rather than dark. As our climate also inclines rather to cold than warmth throughout the year, the general rule should be to have *warm* colouring in preference to *cold*, though our present practice tends more in a contrary direction.

It may not, perhaps, be unnecessary to put, in an untechnical form, a meaning of the terms *warm* and *cold* colouring, which may be at once understood. Some colours are called primary, some secondary, some tertiary. Every reader, we assume, knows a blue from a red, red from green, yellow from purple, and the most obvious and common distinctions of colouring. Without entering into any theory on the subject, we say that blue, red, and yellow are *primitive* colours—that is, that they are self-created colours, because the compounding together of no other colours will produce them. Green, orange, and purple are secondary colours, and result from the admixture of the three primitive colours. The tertiary mixtures, such as olive, brown, slate, are formed by the union of the secondary colours themselves, or the colours which make them, in the same proportions. The two colours which represent the extremes of heat and cold are *red* and *blue*. Yellow stands midway between them, and by itself is neither positively warm nor cold, though it rather more inclines to warmth than coldness, as we see illustrated in the green colours. As greens contain blue, they are cold looking, as yellow warm. Mixed colours, in proportion as they contain red, incline to warmth—as they contain blue, to coldness. It is true, we may have the effects of both warmth and coldness, and strong effects too, without using any positive colour at all; but this requires a peculiar treatment. We purposely avoid entering upon the effects which an artistic knowledge of contrasts may realize. We are writing rather for those who are ignorant of refinements, and our object is to deal with the most general principles rather than any exception of them. Our first canon, therefore, for all general purposes in internal decoration in this country is, that the general colouring be both light and warm; leaden and cold neutral tints should be altogether eschewed, if our aim be to banish gloom and chilliness from our houses, and to have cheerfulness and warmth instead. We are far less liable to error by leaning to warm rather than to cold colouring.

We have now to show what are the circumstances modifying the application of this general rule. The first and most important considerations, as we have already said, are those arising out of ASPECT. Bearing in mind the general necessity for the employment rather of warm and light colours than of cold and dark ones, the circumstances of the aspect of the room to be decorated should regulate the inclination to the use of one or the other. You are going to decorate your drawing-room or dining-room both with furniture and colouring. Before you speak to your upholsterer or house painter, have a perfect understanding and recognition of what is the *aspect* of the room. Let no circumstances make you regardless of this fundamental consideration. No cost will remedy the forgetfulness. Spend what you will, you will always repent having a cold colour in a room lighted from the north, or a very hot colour in a room lighted from the south. If the aspect be north, north-east, north-west, or due-east, the general tone of colouring should be positively warm. Blues, greens, and all shaded colours which involve any predominant use of blue, must be avoided. There is a drawing-room in the Reform Club, looking north, which may convince any one of the mistake of forgetting aspect. The walls and curtains are blue; with all its elegance—and its ceiling and cornice are beautiful—the effect of this room by daylight is always chilly. It would be just the reverse if it looked upon Carlton Gardens. There is also a room in Windsor Castle, looking on the North Terrace, called Queen Adelaide's room, which is decorated with blue and silver—a most frigid looking room even in the midst of summer. In such aspects the choice should tend towards reds, and all their various combinations with yellow. As the aspect approaches east and west, so the colours should verge towards yellow rather than red tints. In an eastern aspect, tints of light yellows, lemon colours, &c. are always effective and cheerful. If the aspect of the room be south, south-west, and west, and open to the direct rays of the sun, then we may venture on the use of cooler colours—even on positive blue, should our taste lead us in that direction.

Shall the colour chosen be used in tones dark or light—full or faint?

The supply of light, the size of the room, and its purpose, appear to be the chief circumstance which ought to regulate the strength or depth of the colours to be used. Where the light is strong, unobscured, and plentiful, the tone of the colouring may be full; on the other hand, where the supply of light is small, the tone of colouring should be light. In the houses of the ancients the strongest and darkest colours—even blacks, as we have already observed—were used on large surfaces, when the apartment received a direct and full light from above. Under a strong and abundant light, full-toned colours preserve their brightness and distinctive character, but when the light is feeble, and the supply of it limited, they become dull and gloomy. Full-toned colours lessen the apparent size of the room: light colouring enlarges it. A little attention to the proportion between the space to be coloured, and the depth of the colouring, becomes, therefore of great importance. If you wish to make your room appear as large as possible, then exclude dark colouring, not only on the large surfaces, but even in the patterns of the paper-hangings, and in the mouldings and ornamental parts. The nature of the use to which the room is applied should also influence the decision as to the tone of colouring. If the room is used mostly by artificial light, which, being less pure than daylight, materially modifies the appearances of most colours—much or little, according to their strength—then keep the colouring light. If, on the other hand, it is a room for occupation during daylight, then the tone of colouring may be deep. Of the peculiar treatment which should be applied to colours when employed in the several sorts of domestic apartments, we shall speak more in detail hereafter. At present we have been dealing only with general principles, which cannot be recapitulated too often. First select the colours—warm or cold—active or passive, on the *plus* or *minus* side, as some writers call them respectively—according to the aspect; and next, remember that the depth or lightness of the colour ought to be no less subjected to regulation by certain principles.

The particular choice of colours seems to be the next branch of the subject to be examined, and on this point we would particularly refer the reader to Mr. Hay's work; but lest that work should not be at hand, we shall extract a few of the most practical and useful observations on each colour. In Mr. Eastlake's edition of Goethe's Theory of Colours, we also find many remarks on the peculiarities, influences, and associations of the principal colours, and as these remarks seem to us calculated to be of some use in directing the *selection of colours*, we shall abridge from Goethe's work those portions which appear applicable to the subject under consideration, omitting the more questionable and fanciful theories with which they are sometimes intermingled.

In respect of *White*, Mr. Hay says, that "in Symes' Nomenclature of Colours there are no fewer than eight different tints of white enumerated, and although the terms reddish white, &c. are rather anomalous, yet there seems to be no other way of denominating the lightest tints of colours. For instance, when the lightest tint of any colour is placed beside the most intense, it will appear to the eye a pure white, but when placed beside the purest white, the colour will appear with which it is tinged. Still, it should be understood, that if it be a single shade beyond the first remove or gradation from pure white, its name must be altered to a light tint of the colour with which it is tinged." A principle is here suggested, which is important in the treatment of most colours. They may be made to appear light or dark, positive or negative, by contrast. Mr. Hay suggests, that if white be used, the colours brought into contact with it "should be light and cool, amongst which grey and green are the most suitable. Very light yellow, of the tint of the primrose, forms also a pleasing arrangement with pure white. Where white is much used, the colouring of the furniture should be relatively light, and bamboo and satin wood are the best in respect of appropriate colour." Some years ago it used to be the fashion to use white and black in direct contrast. Panels painted white, with the beadings and mouldings picked out in black—most disagreeable in effect, and a practice that must be entirely avoided. If pure white is used, it suits best with a south aspect; but if a white is wanted in a north aspect, then it should be so far warmed in tone, as to be at least a cream colour. White is often used sparingly to contrast with violent colours in carpets and hangings: in such cases the effect is confused and crude.

Yellow, says Goethe, is the colour nearest light. In its highest purity it always carries with it the nature of brightness, and has a serene, gay, softly-exciting character. In this state, applied to dress, hangings, carpeting, &c. it is agreeable. "Gold, in its perfectly unmixed state, especially when the effect of polish is superadded, gives us a new and high idea of this colour; in like manner, a strong yellow, as it appears on satin, has a magnificent and noble effect. We find from experience, again, that yellow excites a warm and agreeable impression. Hence, in painting, it belongs to the illumined and emphatic side. This impression of warmth may be experienced in a very lively manner if we look at a landscape through a yellow glass, particularly on a grey winter's day. The eye is gladdened, the heart expanded and cheered; a glow seems at once to breathe towards us. The following assertion appears to us rather too broad in its application. There are surely circumstances, when the yellowish brown of the fallen leaf, as it is termed, might be most judiciously employed; but Goethe's account is rather more poetical than practical. He says, "When a yellow colour is communicated to dull and coarse surfaces, such as common cloth, felt, or the like, on which it does not appear with full energy, the disagreeable effect is apparent. By a slight and scarcely perceptible change, the beautiful impression of fire and gold is transformed into one not undeserving the epithet foul, and the colour of harmony and joy reversed to that of ignominy and aversion. To this impression the yellow hats of bankrupts, and the yellow circles on the mantles of Jews, may have owed their origin. As no colour can be considered as stationary, so we can very easily augment yellow into reddish, by condensing or darkening it. The colour increases in energy, and appears in red-yellow more powerful and splendid. All that we have said of yellow is applicable here in a higher degree. The red-yellow gives an impression of warmth and gladness, since it represents the hue of the intenser glow of fire, and of the milder radiance of the setting sun. Hence it is agreeable around us; and again, as clothing in greater or less degrees is cheerful and magnificent. A slight tendency to red immediately gives a new character to yellow, and while the English and Germans content themselves with pale yellow colours in leather, the French, as Castel has remarked, prefer a yellow enhanced to red; indeed, in general, everything in colour is agreeable which belongs to

the active side. As pure yellow passes very easily to red-yellow, so the deepening of this last to yellow-red is not to be arrested. The agreeable cheerful sensation which red-yellow excites, increases to an intolerably powerful impression in bright yellow-red. The active side is here in its highest energy, and it is not to be wondered at that impetuous, robust, uneducated men should be especially pleased with this colour. Among savage nations the inclination for it has been universally remarked, and when children, left to themselves, begin to use tints, they never spare vermillion and minium. In looking steadfastly at a perfectly yellow-red surface, the colour seems actually to penetrate the organ. It produces an extreme excitement, and still acts thus when somewhat darkened. A yellow-red cloth disturbs and enrages animals. I have known men of education to whom its effect was intolerable if they chanced to see a person dressed in a scarlet cloak on a grey, cloudy day." In reference to this effect, we are inclined to ascribe great part of it to the strength of the contrast between the scarlet and the surrounding cool tones. Yellow is not distinguishable from white in most artificial lights, which are themselves of a yellow tone, and cause *white* to appear so yellow that it is undistinguishable from yellow; and though the fact is often recognized in the preference of lemon-tinted gloves over white, as they serve both for morning and evening wear, it is not so often remembered when papering a room, or selecting a chintz furniture. Mr. Hay recommends that both pure yellow and orange should be avoided in large masses, and used chiefly as heightening colours.

The colours on what Goethe calls the *minus* side, are *blue, red-blue, and blue-red.* "They produce a restless, susceptible, anxious impression. As yellow is always accompanied with light, so it may be said that blue brings a principle of darkness with it. As the upper sky and distant mountains appear blue, so a blue surface seems to retire from us. Blue gives us an impression of cold, and thus again reminds us of shade. It has some affinity with black. Rooms hung with pure blue, appear in some degree larger, but at the same time empty and cold." The blue room at the Reform Club again comes to mind as an illustration in point. The appearance of objects seen through a blue glass is gloomy and melancholy. Red-blue, in an attenuated state, or lilac, is pronounced to be "something lively without gladness." Blue-red generates an unquiet feeling. A carpet of a perfectly pure deep blue would be intolerable. "As the higher dignitaries of the church," continues Goethe, "have appropriated this unquiet colour to themselves, we may venture to say that it unceasingly aspires to the Cardinal's red, through the restless degress of a still impatient progression."

"In *Red* we must forget everything that borders on yellow or blue. We are to imagine an absolutely pure red, like fine carmine, suffered to dry on white porcelain. The effect of this colour is as peculiar as its nature. It conveys an impression of gravity and dignity, and, at the same time, of grace and attractiveness. The first in its dark deep state, the latter in its light attenuated tint, and thus the dignity of age and the amiableness of youth may adorn itself with degrees of the same hue. History relates many instances of the jealousy of sovereigns with regard to the quality of red. Surrounding accompaniments of this colour have always a grave and magnificent effect. The red glass exhibits a bright landscape in so dreadful a hue as to inspire sentiments of awe. The French prefer generally scarlet which inclines to yellow, whilst the Italians choose a crimson with a tinge of blue." The employment of red requires skilful management, and it is often used too indiscriminately. "We have only," observes Mr. Hay, "to look at nature for the proper use of this colour. We shall see that red seldom appears in its full intensity, and when it does so, it is at that season when its effect is balanced and neutralized by the general verdure which clothes the earth." Neither pure red nor scarlet should be used in large masses—it ought not to be contrasted with bright green unless in the smallest quantity. Where the direct light falls upon the ground, and not on the walls, Mr. Hay recommends a bright scarlet on the walls, heightened with gold, with deep-toned colours on the carpet. Crimson makes a capital background for the hanging of pictures, but care should be taken that its tint does not approximate to scarlet or pink. This approximation to pink is a common error. In the new decorations at St. James's Palace, now in progress, where the walls of the state rooms are covered with crimson flock paper, the colour is much too near pink.

Purple, though a good colour by daylight, is much injured and neutralized by artificial light. *Green* is the result of mixing blue and yellow. If mixed "in perfect equality, so that neither predominates, the eye and the mind repose on the result of this junction as upon a simple colour. The beholder has neither the wish nor the power to imagine a state beyond it. Hence, for rooms to live in constantly, the green colour is most generally selected." Goëthe remarks, that "the juxtaposition of yellow and green has always something ordinary, but in a cheerful sense; blue and green, on the other hand, is ordinary in a repulsive sense. Our good forefathers called these last fools' colours." "The colours on the active side (yellow and yellowish) placed next to black, gain in energy; those of the passive (blue and blueish) lose. The active, conjoined with white and brightness, lose in strength, the passive gain in cheerfulness. Red and green, with black, appear dark and grave, with white they appear gay." We see these effects strikingly illustrated in book-wrappers. Black letter-press is applied indiscriminately to red, blue, lilac, green, and yellow covers. A publisher of taste would do well to consider how much the purchase of a book is affected by the first impression it makes.

In the practical application of the foregoing observations to the colouring of surfaces, it seems to us that Nature herself suggests to us those parts

Where Colour shall be lightest—where darkest.

If we look at a landscape, we find three distinct gradations of colour. The greatest light comes from above, the next gradation of light lies in the part between the sky and the ground, and the darkest part is on the ground. The exceptions to this statement, arising from partial obscuration of the direct rays of light, and from reflexions, do not materially affect the principle here laid down, and which we think is applicable to the artificial use of colour in interior decoration. In accordance with it, we say, let the ceiling be the part *lightest* in colour and tone, the walls darker than the ceiling, the floor darker than the walls. The reverse is too often found in practice. In the Reform Club, the mouldings of the ceilings of the upper and lower quadrangles surrounding the great hall, and those of the upper library, are painted to imitate bronze, and in the quadrangles especially they are much heavier in colour and appearance, than the walls by which they are supported. In the drawing-room floor where the colouring of the frieze and festoons is light and mean, the ponderous look of the ceilings is objectionable. And here, though we are not considering especially the decorations of the Reform Club, we take the opportunity of remarking on the poverty of invention, not to say the contradiction, of colouring the ceiling of the lower quadrangle as if to represent blue sky, when it is palpable to the eye at the time, that it supports the floor of the passage above it. In the upper drawing-room of the same Club, the light maple wood book-shelves are much less positive in colour than the beautiful ceiling above them, which is of bright blue, heightened with gilding between the bronze-painted divisions. Fortunately, the dark-green furniture and the deep crimson carpet in this room, are some balance against the full tones of the ceiling, or we should have here an example of the reverse of the principles which Nature seems to suggest. In the great drawing-room, it appears that the decorations are far more consistent. There the ceilings, being shades of white and light pink with gilding, are elegant and rich, yet lightsome and cheerful; less coloured than the walls, which are of a yellowish brown damask, the colour Goethe seems to reprobate, and the walls again are subordinate in the strength of their colouring to the floor, which is a deep-toned maroon in its masses. We are not unmindful of the full-toned colouring of the Venetian ceilings, which might be quoted apparently in opposition to what we have here advanced. For the present, without discussing particular instances of the practice of painting ceilings in intensely full tones, it is sufficient to point out, that what might be tolerated or even defended in the works of a Paolo Veronese, is not to be safely upheld as a precept for the common house-painter, whom alone, and not the poet-painter, we are attempting to influence. It may be as well to observe, that according to the depth of colouring in the ceiling, so the apparent height of the room is lowered and brought near to the eye: and, as in London houses, the height of the rooms is seldom suitably proportioned to the size of the room, this artificial lowering becomes a consideration, which ought not to be disregarded. Not only, to our mind, ought the ceiling to be the lightest in point of tone, but it ought to be the least decorated part of the room—What? venture to say this with Michael Angelo's Sistine Chapel in remembrance? Certainly—and we would call in evidence all who have seen this marvellous work, the strongest case perhaps that can be produced, to testify their regret, that those wondrous works are on the ceiling, and the extreme difficulty, no less than lying flat on the back, which is experienced in viewing them. But because we object to having the chief decoration on the ceiling—the part obviously most difficult to see, we would not have it imagined that the ceiling is to be left bare, as it generally is in practice. On the contrary, we desire to see special attention bestowed on the—

Decoration of Ceilings,

and Mr. Barry is to be thanked for the good example he has set at the Reform Club, although some of the details do not seem, in our judgment, to be quite right. The coloured decoration of this part of a room, generally extends little beyond the tinting in one or two faint colours the cornice or the plaster ornament in the centre; though sometimes, indeed, we meet with the hideous practice of painting artificial skies and clouds—a miserable conceit, always to be eschewed. We are convinced, from actual experiments, that very effective and cheap decorations might be used in ceilings, The colouring of mouldings and cornices by the hand, and indeed all hand labour on a small scale, is slow, and therefore costly, but the plan we would recommend, and hope to see extensively used for the adornment of ceilings, is much more simple and easy of performance. Ceilings may be treated as easily as walls. Papers may be prepared expressly with suitable patterns, and they may be attached, afterwards, to the walls like common paper hanging. After making some little allowance for the extra trouble in affixing the paper to the ceiling, there seems to be no reason why the ornamental papering of ceilings should be more costly than that employed on the walls. In one experiment, we directed a paper surface of about ten feet in diameter to be prepared, which contained Pompeian forms expressed in four colours, and which cost, in its preparation, about forty shillings. Had the same design been executed in great numbers, there is no doubt that it might have been produced for half the money, or even less. On the other hand, had the design been painted on the ceiling itself, by the hand, the cost would have been much increased. The economy of the process of affixing the ornament in a large surface at once to the ceiling, is obtained precisely on the same principle as that of laying the tesseræ in blocks on pavements, according to Mr. Singer's patent, instead of laying tesseræ one by one on the floor.

Leaving out of the account the additional beauty which tasteful colouring on the ceiling confers on a room, we would recommend the practice as economical—a charm oftentimes more attractive in these money-making times than beauty itself. In the course of every three or four years, the ceiling of a London house requires re-colouring. There is little doubt that the determined lines of the positive colouring in an ornamental design, and also the paper itself, would tend very much to conceal the ordinary cracks and markings in the ceiling, caused by the dirt and smoke, and thus reduce the necessity of re-colouring. In addition to the experiment already mentioned, we had a simpler one prepared in two shades of deep straw-colour, for the centre of a room, the cost of which experiment was only five shillings. In the prosecution of these experiments, it is only just to mention that we had the assistance of Mr. Clarke, a paper-stainer, of 60, High Holborn, who seemed well disposed to carry them much farther, if any public taste could be generated for them. In the preparation of decorations for ceilings, and until we can enter upon the subject of pattern in detail, a word of caution may be whispered against all and every sort of imitation of raised surfaces. Let there be no sham cornices or rosettes for centres—no sham festoons, draperies, or tassels. Whatever is done, should be limited to the expression of agreeable forms in colour, and much more effect may be produced under this limitation than is generally obtained by the plaster mouldings and ornaments themselves which are commonly attached to ceilings. The choice of the colours and peculiar treatment of them in ceilings must, of course, be regulated by the circumstances of the room, and the character of the decorations used in it.

The particular treatment of colours which should be applied to rooms of various purposes, seems to follow next in order for consideration. We are much disposed to agree with Mr. Hay, when he insists that the decorations of rooms should be subordinate in importance to the furniture, which he appears to regard in the same relative importance to a room as figures stand towards a picture. Mr. Hay says:—"In toning and harmonizing the colours in a picture, the artist has the assistance of light and shadow, and can make his shades accord with the tone in such a manner as to improve the general harmony; but as the colours of the house-painter and manufacturer are all liable to be placed in a full light, they must be toned in themselves, to prevent that unnatural crudeness so annoying to the eye. How, then, can we account for the prevalence of those gaudy paper-hangings, which impinge the most obtrusive rays in all their vigour, or those carpets where the preponderance of bright yellow and red attracts the eye, and injures the effect of everything which is placed upon them? And if, according to the rules which regulate the higher branches of art, simplicity of arrangement prevents confusion where a variety of colours are introduced, the colours in the generality of such articles are most erroneously arranged. These rules must proceed from a general negligence of the rules of harmony. I do not mean by this that bright and vivid colours are always offensive. I have already said, that they add richness and grandeur when used in their proper places and in proper quantities; but they should by no means cover the floor or walls of an apartment unless under very peculiar circumstances. It may here be observed, that in all pictures representing interiors, when a group of figures is introduced, there may occasionally appear a piece of rich drapery, or furniture painted in equally vivid and bright colours with the figures, and which may, in a great measure, improve the general effect and harmony; but who ever saw, in a work of merit, the colours on the walls of the apartment or carpet on the floor making a monopoly of attraction, and causing those upon the figures and furniture to fall into insignificance?" But we have no more space at present, and the suggestions touching the appropriate colouring of particular rooms must be reserved to a future opportunity.

RAILWAY CHRONICLE OF THE MONTH.

THE events of the month principally concern the movements in respect to new lines, a spirit of activity manifesting itself in connexion with them strongly indicative of improvement. Not only is the number of lines proposed far greater than for years past, but they are of greater importance, and supported in a much more powerful manner, being principally branches fostered by the great lines. There is however, of course, a want of definite information as to what will really be done, so that it is dangerous to speculate as to results.

The monetary operations of the month afford a strong proof of the improved position of railways; not only have the transactions in shares been much more numerous and at better prices, but loans have been effected by the large companies at a much lower rate of interest.

The Edinburgh and Glasgow Railway Company have borrowed £100,000 from the Bank of Scotland for ten years at 3½ per cent., and the Manchester and Leeds have received large sums at 3½ per cent., the loans being subject to repayment on twenty-one days' notice. Altogether the state of affairs promises well for employment next year in the engineering profession and in the pursuits dependent on its exertions and connected with it.

The York and North Midland directors have been authorized to purchase the Leeds and Selby line, and to construct a branch to Whitby and Scarborough.

Captain Moorsom, the Chairman of the Birmingham and Glo'ster Railway, has at last resigned in disgust. He is succeeded by Mr. Samuel Bowly, the Deputy Chairman.

The Manchester and Leeds Railway Company have agreed to amalgamate with the Hull and Selby Railway Company.

One of the most striking circumstances has been the defeat of the Bristol and Exeter Directors at a special meeting for the purpose of giving support to the Devon and Cornwall lines, when a cabal of 38 Exeter shareholders holding 300 shares, managed, by superior numbers, on the show of hands to repel the resolutions. It is not expected that this will stop the scheme.

The Epsom traffic is the subject of competition between the Croydon Railway Company on the one hand, and the South Western Railway on the other. The South-Western branch would be the shorter, less costly, and accommodate west end passengers, but the distance from the terminus of the Croydon branch is not greater, it would be worked as cheaply and would also accommodate a great extent of local traffic, while it comes close to the city population at London Bridge. It was anticipated that great opposition would be made by the Croydon shareholders to engaging in this speculation, but it turned out that they gave their unanimous adhesion to it, at a meeting specially convened for the purpose. At the same time strong wishes were expressed for an arrangement with the Greenwich Company which is now within a narrow compass. It was also reported that a proposition had been made from the South Eastern Railway Company to lease the Croydon, which had been refused, the Croydon Directors considering amalgamation as the more eligible measure. With regard to the South Western Epsom operations they remained to be seen, but it is very probable that both lines will be carried into effect, and an arrangement come to for working them. The Middlesex and Surrey Junction is a scheme also for going to Epsom, but it moves very slowly.

THE NEW ROYAL EXCHANGE.

MR. TITE, the architect of the New Royal Exchange, sent in, on the 20th ult., a further report of the progress of the works, to the Joint Grand Committee; it is extremely satisfactory. It states that, with respect to the external works, the grasshopper vane, repaired and regilt, was deposited in its place on the 8th ult.; that the tower was completed to the cleaning down of the stonework, a process which will be effected as the scaffold is being removed. At the west façade the columns and architraves of the great Venetian windows have been set, and the carved shields and festoons over the opening and over the whole of the central arch have been finished. As to the internal works the report touches first upon the basement, and states that the vaults over the basement have been completed, with the exception of an arch which is to be formed under the staircase leading to Lloyd's. In the London Assurance portion of the building, on the one-pair floor, the whole of the fire-proof arches have been turned, and the joists and partitions in the western end are in their places. In other parts the plates are laid. On the two-pair floor the joists have been laid all through. The roof has been nearly completed, both plumbers' and slaters' work being almost wholly finished. In the Royal Exchange ground-floor the fire-proof arches have been turned throughout, and the joists and partitions have been nearly all deposited in their places. In the two-pair floor the joists have been all laid and the quartering is in a forward state. The lead-work to the roof of the portico has been within a third completed, and this department will require very little more labour generally. In the unappropriated room on the one-pair floor the fire-proof arches have been completed as well as the joists and partitions. In the two-pair floor similar progress has been made. In Lloyd's room on the one-pair floor all the fire-proof arches have been turned. The reading-room and other rooms on each side of the tower remain in the same condition in which they were represented to be at the time the last report was made. In the roof the plumber's and slater's work is throughout exceedingly forward, and but little remains to complete that portion of the work.

With regard to the sculpture, Mr. Tite expresses his satisfaction to be able to report that every figure has been transferred from the model to the stone, and that a month's labour will complete the work, so as that it will be ready for hoisting within that period. When the sculpture shall have reached its appropriate position, the finishing touches will be given to it by the sculptor. Judging from its present advanced state, the architect entertains no hesitation in assuring the committee, that if necessary, it could all be in its place and completely finished within two months from the date.

The dials and hands of the clock have been prepared, and will be placed as soon as the scaffold has been sufficiently removed to enable the men to place them with safety. The machinery of the clock is very nearly completed, and the only thing remaining unsettled is the arrangement with respect to the actual tunes of the chimes. Upon that subject Mr. Tite had consulted Professor Taylor, the Gresham Lecturer on music, and he hoped that before the next meeting of the committee he should be prepared to report the result. The moulds for some of the bells have been prepared, and in the course of a month several of the bells will be cast. Mr. Tite concludes with congratulating the committee, at the close of the third year of the work, on the generally favourable state of the seasons throughout the whole period. The mildness of last winter, and the unusually fine spring which followed, were greatly in favour of building operations, and though the early part of the summer was wet, yet since August up to the present time scarcely a day has been lost by interruption from the weather. He could see nothing at present, unless some unusually severe weather should occur after Christmas, to prevent the realization of his hopes that the contract would be completed in the time originally agreed upon.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL ACADEMY.

On Saturday Dec. 9, being the 75th anniversary from the foundation of the Academy, a general assembly of the Academicians was held at their apartments in Trafalgar-square, for the annual election of officers and other business, amongst which was the ceremony of delivering the prizes to the successful candidates in the various classes of students. The distribution took place in the grand saloon of the Academy, before a very numerous assemblage of royal academicians, arfists, and persons of distinction.

In consequence of the sudden indisposition of the President, Mr. Jones, R.A. (the Keeper of the Academy) took the President's chair, and announced officially and with regret the cause of their accomplished President's absence, which he truly stated they all felt as a great disappointment, but the cause of which he could assure them would not be of long duration. Of course, it fell to his lot as the senior officer to go through the duties of the evening, however unprepared he might be for that purpose. The prizes were fewer this year than on any former biennial distribution, for there was not a single candidate in the first class (historical painting). This incident had, doubtless, arisen from the exertions to get up the cartoons having occupied the time of those who were in a condition to compete for these prizes. The chairman then bestowed the prizes on the following students :—

Mr. E. B. Stephens, for the best composition in sculpture—The gold medal, and the Discourses of the presidents Reynolds and West.

Mr. Henry Bayly Garling, for the best architectural design—The gold medal, and the Discourses of the presidents (as above).

Mr. J. Harwood, for the best copy made in the school of painting—The silver medal, with the Lectures of the professors Barry, Opie, and Fuseli.

Mr. A. Ranckley, for the next best copy made in the painting school—The silver medal; but, this student having received a similar medal in 1842, this medal, though adjudged to him, could not be given.

Mr. A. Solomon, for the best drawing from the living models—The silver medal. There was only one medal given in the class this time.

Mr. G. Perry, for a drawing of the west wing of Greenwich Hospital—The silver medal.

Mr. J. E. Millais, for the best drawing from the antique—The silver medal and the Lectures of professors Opie and Fuseli.

Mr. G. E. Sintzenich for the next best drawing from the antique—The silver medal.

Mr. J. Engel, for the best model from the antique—The silver medal and the Lectures of professors Opie and Fuseli.

Mr. A. Gatley, for the next best model from the antique, the silver medal was adjudged, but not bestowed, as he had already (in 1842) received a similar medal.

Mr. W. Thomas, for the next best model from the antique—The silver medal.

On the audience retiring, the Academicians proceeded to the election of officers, &c., for the ensuing year, when Sir Martin Archer Shee was unanimously re-elected President.

INSTITUTION OF CIVIL ENGINEERS.

The Council of the Institution of Civil Engineers have awarded the following Telford and Walker Premiums, for Papers read during the last session, 1843 :—A Telford medal in silver to F. W. Simms, for his papers "On the application of horse-power to raising water, &c.," and "On brick-making." A Telford medal in silver, to W. Pole, for his papers "On the friction of steam-engines, &c." and "On the pressure and density of steam &c." A Telford medal in silver to T. Oldham, for his "Description and drawings of the automaton balance, invented by Mr. Cotton, and used at the Bank of England for weighing sovereigns." A Telford premium of books to D. Mackain, for his paper "On the supply of water to the city of Glasgow." A Telford Premium of books to D. Brimner, for his "Description and drawings of the Victoria Bridge over the river Wear." A Telford Premium of books to D. T. Hope, for his paper "On the relative merits of granite and wood pavements, and Macadamized roads." A Walker premium of books to Robert Mallet, for his paper "On the co-efficient of labouring-force in water wheels, &c." A Walker premium of books to W. J. M. Rankin, for his papers and drawings "On laying down railway curves," "On the spring-contractor for railway carriages," and "On the causes of the fracture of railway axles, &c." A Walker premium of books to W. L. Baker, for his "Description and drawings of the water pressure engine, at the Alte Mördgrube mine, (Freyberg)." A Walker premium of books to S. C. Homersham, for his paper and drawings "On the construction of valves for pumps, &c." A Walker premium of books to J. O. York, for his paper "On the comparative strength of solid and hollow axles." A Walker premium of books to G. D. Bishopp, for his "Description of the American locomotive engine, 'Philadelphia,' used on the Birmingham and Gloucester Railway," communicated by Captain W. S. Moorsom. A Walker premium of books to G. B. W. Jackson, for the drawings illustrating "The description of machines for raising and lowering miners," by John Taylor.

In the report of the proceedings of the Institution of Civil Engineers, in last month's *Journal*, p. 427, we stated that we rather suspected Mr. Wicksteed had been misunderstood in his remarks on the Construction of Valves. We have since made inquiries and believe the following statement will be found to contain a correct report of Mr. Wicksteed's observations :—

Mr. Wicksteed observed, that with two valves made according to Harvey and West's patent, and fixed in the pump work at Old Ford, each valve being 4 feet in diameter, the lower valve rose 4 or 5 inches, while the upper one rose from 1¼ to 1⅝ inches only. The concussion in these valves was much less than in the ordinary valves—that although the wooden faces in the seat of the upper valve, where the lift was so little, had lasted for three years, they would not stand in the lower valve, where the lift was greater; for which latter he considered metal far superior to wood, and he considered metal better for the upper one also ;—he had not found any corrosion attendant upon the contact of the two metals. The reason that the lower valve of the pump at Old Ford had not answered so well as the upper valve was owing to the difference in form of the valve boxes; the lower valve box was of an irregular shape on the plan, while the valve was circular; in addition to which, the exit pipe branched from the box at a level with the seat of the valve, and this is of even greater importance. The passage of the water therefore through the valve was irregular, a greater quantity passing on one side than on the other, which caused the valve to cant and to wear out the guides; but on the contrary, in the upper valve, the exit pipe was above the top of the valve, and of a circular form, allowing the water to pass more equally on every side of the valve, and hence the guides were not worn as in the lower valve; and in the cases of above 40 valves which had been introduced by his recommendation into pumps made by Boulton and Watt, and other firms at various dates, the boxes being circular and the delivery pipes above the valve, they had worn as well as the upper valve at Old Ford (and in a commercial point of view it is important to remark that in none of those instances was it necessary to alter the boxes, or pipes connected therewith), he therefore recommended that in all new constructions where these valves were required, the form of the box and the position of the delivery pipe should be carefully attended to. He considered that the form of the double-beat valves, being cylindrical, possessed greater strength, and made the liability to fracture less than in the ring valves, as originally designed by Mr. Homersham, and he considered that the model on the table, which as nearly as possible resembled the form of Messrs. Harvey & West's valves, was a decided improvement; at the same time, it made it evident that the actual difference between these valves and Messrs. Harvey & West's was the application of two valves, one placed above the other, instead of one, the advantages of which he could not perceive. He at the same time, gave Mr. Homersham great credit for the ability displayed in the paper just read, and thought that if the same talent had been applied to the proper proportioning of Harvey and West's valves to the locality or circumstances in which they were required, he would have effected the good object he had in view at less cost, as there could be no doubt that, if not properly proportioned, the valves could not work so well.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

December 4.—W. Tite, Esq. v.p., in the Chair.

A letter was read from C. R. Cockerell, Esq., R.A., giving some account *of the Foundations of the Church of St. Bartholomew*, near the Bank of England, removed in 1841, under his direction. The letter was accompanied by a plan, and two elevations of the north and east walls, which explaining the principle of their construction, were of very great interest, as showing the rude, but efficient manner of building adopted by our forefathers, as also the masterly judgment and skill with which Sir C. Wren, availed himself of these foundations, in his new structure, after the fire of London. In the east wall, the piers, a swell as those under the pillars of the nave, were formed by digging a pit, into which a mass of well made concrete, consisting of chalk, fragments of tile, stone, pebbles, and lime, were cast, the surrounding ground being left undisturbed: this concrete penetrated about one foot into a good stratum of sound gravel. Where arches were required, as in the east and north wall, in order to continue the course of the wall without the expense of so much foundation, the natural soil was left undisturbed, and formed a rude centering from pier to pier, on which the voussoirs of the arches, in chalk, were at once placed. From the springing of the piers, which took the form of the pit into which the concrete was cast, the masonry in chalk and rag, battered on the face, was of a superior kind, the centre however being filled with concrete. The side walls of the church were of a better masonry, with upright faces. The north wall rising with the natural bed of gravel, was found to be inferior to the rest, being often composed of pebbles, or shingles laid in loam instead of mortar. Such was the simple manner of building adopted in the old church, the date of which may have been the 12th or 13th century. But the judgment, skill, and economy of Sir C. Wren, in the employment of this rude substructure, and erecting upon it a finely proportioned church of the Tuscan order, cannot be sufficiently admired. His argument here, was doubtless the same he employed at St. Paul's. "If," said he, "these foundations have carried the ancient superstructure without failing, I will take care, by lessening the weight of the new, that they shall suffice for my purpose, and I shall economise all the expense which new foundations would occasion;" and the sound

state in which every part of Sir C. Wren's Church was found, after standing about 170 years, has fully borne out his argument. The tower of the church was built in a very superior manner, with thicker walls of flint aud chalk.

Mr. T. W. Papworth exhibited a volume containing a collection of decorations for a chapel in the Cathedral at Lisbon, made at Rome in 1755. It appears, from these drawings, that the architect sent his general designs to Rome, and that the details were there filled up by the most eminent decorative artists. The name of Pompeio Battoni, who was to supply some painting of the higher class, occurs among the number. There are designs for the pavements, railings, hangings, and every description of decoration and furniture to make the work complete. The artistical knowledge displayed in these drawings throughout the variety of operations necessary to carry out a work of this kind, and the unity of purpose with which it is brought together and applied, is what is principally deficient in our modern system of architecture.

December 18, 1843.—W. TITE, ESQ., V. P., in the Chair.

The following communication was read from Mr. BENJ. FERREY, Fellow, on Mr. SILVESTER'S "*Process for repelling moisture from external walls.*"

It will be in the recollection of many members of the Institute, that Mr. Sylvester, at a meeting during the last session, directed attention to the discovery of a process by which bricks might be made impervious to moisture, and exhibited some experiments, placing bricks of a very porous description which had been subjected to the process, into water, allowing them to be immersed for some time, and showing, when taken out of the water, that they had imbibed no moisture. These experiments, at the time, were considered satisfactory, and the cheapness and ease attending the application to the process, were strong recommendations in its favour.

It happened during last summer, that I was called upon, in a distant part of Dorsetshire, to suggest some means by which the wet might be prevented from penetrating the external walls of a school-house that had recently been built in a very substantial manner, with bricks of the best quality; but where, owing to the elevated and exposed position of the building, it was found that neither increased thickness of walling, nor internal battening would answer, to make the school habitable, and nothing but an external coating of cement, was by the proprietor of the building, thought capable of remedying so serious an evil.

It occurred to me that this was a good opportunity of testing the merits of Mr. Sylvester's recommendation, and, it being a favourable period of the year for external colouring, I ordered the operation to be commenced, availing myself of the services of a clerk of the works, whom I had in the neighbourhood, to see that the liquids were carefully and properly applied.

I should mention that the walls of the school-house were built of kiln-burned bricks from a village called Broad-mayne, well known as supplying the best bricks in Dorsetshire: in situations protected from the severe effects of south-west storms, these bricks are found to be proof against the ordinary effects of weather, but in many hilly parts of Dorsetshire, nothing but the most compact and indurated material will resist the violence of the tempests, and I have remarked how many ancient brick buildings with stone dressings, have, in various parts of this country, been disfigured by coatings of cement or blue lias. This practice has evidently been resorted to, as the general cure wherever the wet penetrated the walls, and it would have been adopted in the present case but for my interposition.

As it is probable that many Gentlemen may be present when this letter is read, who were not at the Institute when Mr. Sylvester described the materials of his solutions, I will state how they were composed by us, in accordance with Mr. Sylvester's directions.

The ingredients were mixed in the following proportions:—¾ lb. of mottled soap to 1 gallon of water. This composition, when in a boiling state, was laid over the surface of the brickwork steadily and carefully, with a large flat brush, so as not to form a froth, or lather on the surface.

This wash was permitted to remain 24 hours to become dry and hard.

Another mixture was then made in these proportions:—½ lb. of alum to 4 gallons of water, which, after standing 12 hours, in order that the alum should be completely dissolved, was then applied in like manner, with a flat brush over the coating of soap. I need scarcely mention, that we availed ourselves of settled and dry weather during July, for these operations.

I have now to speak of the result up to the present time, as to the success of the process. Within a month after the trial, there happened one of those tremendous south-west gales, accompanied by heavy, driving rain, such as had formerly drenched the school-house, and obliged the inmates to put pails, cloths, &c., to catch the drippings inside. It is satisfactory to state that the walls were completely proof against the rain; not a drop penetrated through, during 48 hours of the most severe weather, nor from that time to the present, though repeatedly subjected to like trials, have the walls admitted the least moisture, nor has the artificial coating suffered apparently the slightest injury.

The liquid when applied, formed a complete thin scaly, or gummy looking integument, perceptible only upon close inspection, causing no discoloration, but producing rather a mellow appearance, such as a building obtains when covered with lichens; the rain splashes against the walls as against glass, and runs down the face in a similar manner.

Upon communicating to Mr. Sylvester, this satisfactory result, I was glad to hear from him of other useful purposes to which this simple process has been applied; at the same time I learnt that about ten years since he advised this method to be applied to the north front of a stone-building near London, where the damp and discoloration were very offensive. His suggestion was attended to, and with complete success.

It certainly appears to be a simple, cheap, and useful discovery, performing its purpose without discolouring the material on which it is laid, and being therefore unobjectionable on this account. Although from the nature of the thing, it may be more frequently wanted for brickwork, it is said to be equally effective on stone, for precisely in the same degree that the structure of the stone admits moisture through its imperfect formation, will it receive that solution; so that the pores or vesicles on the face of the stone became filled with insoluble particles,—it is therefore immaterial whether the stone be of lime, sand, or oolitic formation. The value of a process which may give an indurated surface to many kinds of stone that before were unfit for building purposes, by reason of rapid disintegration under the effects of wet and frost, will be duly appreciated by the architect, and though it may be hazardous to use at once materials of doubtful quality, relying upon this remedy, yet it is a subject quite worthy of our best attention, and I think it right to mention what has been told me in reference to this most important object.

From the perfect success which attended experiments in other parts of the country similar to what I have described, the County-Surveyor of Kent made a bold trial of the process.

A block of the Gatton or Reigate stone, when taken from the quarry in its green and soft state, was worked into a cistern to contain water, and after becoming hardened and dry by the exposure to the atmosphere, it was well covered all over, both within and without, by the wash of soap and alum this being properly done, it was at once filled with water, and used for the ordinary purposes of a leaden cistern; this was done about three years since, and the cistern is now in use, never having leaked in the slightest degree from the day it was first used, although exposed through the winters, without any protection whatever.

Perhaps no substance could put the process to a severer proof, than Gatton stone:—It is described in the Parliamentary Report of the Commissioners, as composed of fine siliceous grains, with a calcareo-silicious cement, containing green silicate of iron, and plates of mica. It is a stone that will not stand the weather, and though it has in former times been much used, all the exposed portions of such edifices, are destroyed.

I have had some experience of the unfitness of this stone for building, having used it, at the strong solicitation of an employer, and against my own conviction, in some court halls and external screenwork, and where, within two years after its use, the greater portion had split and become shattered, from the effects of frost. I need scarcely say, that it was near to the Gatton quarries, and that its cheapness was the recommendation in the eyes of my employer.

Any composition for the preservation of stone, having a lasting effect, must be most valuable. It is true that nothing but time can prove whether the effect is permanent; this difficulty attends all schemes. It is an argument employed to depreciate the use of those processes by which timber is protected from decay, and it is an objection which, if permitted to operate too strongly, may go far to discourage scientific men from directing their energies to most important purposes.

It would indeed be a great point gained, if the architect, by the use of a simple chemical solution, superficially applied, to protect the external faces from the effects of weather (for it is obvious that decay occurs chiefly upon the exposed surfaces,) could employ stone, extensively to be met with in different parts of the country, but which, at present, he dare not use, from the established fact of its early tendency to decay,—thus, the Tottenhoe, Reigate, the Clunch, the Malm Rock, and other formations, though suited for internal work, are utterly unfit to be used out of doors. It would not be difficult to enumerate a great many more kinds of stone prohibited at present. I have alluded particularly to this, because it is a favourite notion of Mr. Sylvester's, that these stones may be brought into use with a certainty of their durability if they are subjected to the process which so effectually secures bricks.

Both oil and bees'-wax are much used even now to stop the pores, when there is a suspicion that the stone not being sufficiently seasoned, may be shattered by the frost, it is however obvious that such applications can only serve a very temporary purpose. It is to the contact of two soluble ingredients whereby a new and insoluble chemical substance is produced, that we can reasonably look for important results.

There is no inherent cause for decay in either stone or brick; two blocks of stone from the same quarry, but from different parts, will be equally sound for building purposes, secured from weather; but the same pieces, if placed side by side on the south west side of a building, would be very differently affected, and one might speedily exhibit a rotten tendency, when the other would stand sound.

If stone or brick contain within itself substances which, by chemical agency, could destroy their structure, it might seem a hopeless matter to devise a preparation for the surface that could stop such natural disruption, or if it were ascertained that either of these materials exuded moisture, from saline particles forming part of their substance, whereby the action of

frost might in that manner lead to pulverization, there might be difficulty in counteracting such effects—it is however a well ascertained fact, that no such tendency exists. I cannot do better than refer you to some very able remarks by Mr. C. H. Smith, in answer to questions put to him by the Commissioners on the Fine Arts, in reference to the causes of damp upon the internal surfaces of walls, where it is clearly not produced by the penetration of rain; that gentleman attributes these defects to accidental circumstances, such as are mentioned by him in his reply to the Commissioners.—(See *Journal* for last month (p. 424.)

I have extended these remarks beyond my first intention, which was simply to mention the result attending the use of Mr. Sylvester's preparation. It appeared to me proper to communicate the facts here mentioned, to my professional brethren, and I have only further to add, that since I commenced writing this communication, I have heard that the same process has been applied to a large building having a frontage of 100 feet, and to another school-house, and that the cost of the ingredients for completely coating these buildings, was 45 shillings only.

SOCIETY OF ARTS, LONDON.

Nov. 8.—The commencement of the session for reading papers was occupied by a paper on the various means for preserving life in case of shipwreck; there were many ingenious devices and models exhibited. The paper was ably drawn up by Mr. Whishaw, the indefatigable Secretary of the Society.

Nov. 15.—A communication by Mr. Pellat, on *Coating Iron with Zinc and Copper*, was read; it was similar to the paper read at the Institution of Civil Engineers and reported by us in the November *Journal*. Mr. Pellat stated that the cost of coating iron with zinc was about 3*d.* per superficial foot, and with copper 8*d.*

Nov. 22.—The Secretary read a paper accompanied by models and diagrams, illustrating Mr. Charles Wye Williams's argand furnace and conductor pins for boilers.

Nov. 29.—Benj. Rotch, Esq. V. P. in the chair. A paper by Mr. Dyer, on *Patent Metallic Sand Cement*, was read by the Secretary. It stated that the cement was composed of blue lias lime, mixed with the metallic sand. This sand is produced by grinding copper slag by means of powerful machinery, and consists of iron, zinc, arsenic, and silica, the iron predominating; the slag is procured in abundance in Swansea, In chymical analysis it is very similar to the pozzolano, and in point of durability it is found to be equal to the latter. With blue lias lime, which is used for hydraulic works, the metallic sand readily enters into combination, and these having been used together for external works, exposed to all the changes of the atmosphere, have proved the indurating quality of the metallic sand, after an experience of eight years. Specimens were laid on the table: 1st, brickwork of a fresh-water tank, which had been erected six years, was removed by a pick-axe; the bricks yielding to the strokes of the axe, but the cement remaining solid; 2nd, imitations of marble executed by a painter on the face of stuccoed-work, formed of metallic cement, in conjunction with common chalk, lime, and putty, and afterwards polished; 3rd, a specimen of fresco-painting, also executed on a face similar to the above; 4th, a vase, the figures on which retain their original sharpness, although it has been exposed to the atmosphere for many years.

Dec. 6.—A paper was to have been read by B. Rotch, Esq., on a new turn table for railways, and a new weighing machine, but, owing to the sudden indisposition of that gentleman, the subjects were postponed to a future evening. The information only reached Mr. Whishaw a very short time before the hour of meeting, but, not to allow the visitors to be disappointed, with his usual tact, had a large assortment of the various locks, models of which have been, for many years past, sent to the society, placed on the tables, and the principles of which were ably explained by Messrs. Solly and Varley, two members present. Barron's, Mordan's, Chubb's, Duke's, Bramah's, and various other earlier patents, were described; and the wooden model of a lock was exhibited, the original of which was brought from Egypt, and supposed to have been in use 2000 years ago—yet, strange to say, it exhibits, in its workings, though of rude construction, a close similarity to more than one of the modern patents.—Mr. Varley exhibited a specimen of wheat straw, taken from a specimen which had been purchased by him, from which he had gleaned nearly as much wheat as would pay for the whole truss of straw. This, he said, he was convinced was frequently the case, and he attributed it to the imperfect mode of thrashing, as generally adopted, although so many excellent machines exist. The evening closed with the society's usual routine business.

Dec. 13.—B. B. Cabbell, Esq., V. P., in the chair.—The Secretary read a paper on Mr. Johnstone's plan of forming a fixed breakwater.

The plan is as follows: a series of distinct and separate caissons—each representing in external form one half of the pier of a bridge, with its cut-water presented to the sea—is to be formed in four to six fathoms water, according to localities. Each caisson to consist of cast-iron plates of large size, and one inch in thickness (prepared with coal-tar, so as to resist corrosion), bolted together by means of four inch flanges; the whole to be filled with concrete, granite, or other suitable material. The lower part of each caisson, to the height of thirty-two feet, having a foundation platform of wood, to be completed on shore, and when prepared to be launched, and towed out to its position, and then lowered; the whole to be secured to the bed of the sea by means of cast-iron piles, driven through tubes of the same material.—As the upper part of the caisson is put together, so is the interior to be filled up with the solid materials, and to be coped with clamped masonry. The weight of each caisson, complete, would be 4,500 tons; and the cost of a breakwater on this principle, extending to nearly a mile in length, is estimated at 297,800*l.*

The Secretary next read a paper by Mr. Claudet, "*On the Daguerréotype Art*," including a complete history of its origin and progress; one of Mr. Claudet's assistants showing, by means of artificial light, the whole process of producing a picture. The most important part of this communication related to an improvement lately applied; it is a process of engraving on a metallic plate. M. Fizeau is the discoverer of this new mode of engraving. Professor Grove has tried the process, which consists in dissolving, by the electrotype process, those parts of the picture which consist of pure silver. Thus the plate is etched in, and transformed into an engraved plate for printing; the action, however, of the galvanic battery sometimes extends to those parts which should remain unattacked.

Dec. 20.—W. H. Hughes, Esq. V. P. in the chair. The Secretary explained the Automaton Calculator invented by Dr. Roth, of Paris, by which any number, either simple or compound sums, may be rapidly and accurately added together, provided the whole amount does not exceed 999,999, or 999,999*l.* 19*s.* 11⅔. The instrument consists of an oblong mahogany box, 15½ inches long, 2½ inches wide, and 1 inch thick, having a metal plate at the top, in which are 9 semi-annular perforations, beneath which are fixed the requisite trains of wheels. Round the perforations are engraved the index figures, opposite to which, in the perforations, are the teeth of corresponding wheels. Under the indexes are 9 circular holes, in which the numbers set down appear as if written on paper or a slate. To set down any required figure, a pointer is inserted in the notch corresponding with that figure on the index, and by pressing the pointer against the left-hand tooth of the notch, it is moved down to the left extremity of the annular perforation, and the figure is at once exhibited in the circular hole beneath. When the operation of adding up any amount within the range already mentioned is finished, it is requisite that 0 should be shown in each of the semi-circular holes, before another operation can be performed; this is done by pulling out a slide at the left end of the instrument, which first gives 999,999*l.* 19*s.* 11¾*d.*, and by adding ¼*d.* the nine 0s are obtained at once.

Mr. G. A. Hughes, who has been blind for seven years, exhibited his system of Stenography.—The system consists of two dots, the one smooth and the other rough, which, with the aid of a guide line, are so arranged that all the letters of the alphabet, as also the numerals, are readily represented, merely by impressing the paper, either with the smooth end or rough end of the embossing instrument, in squares, regulated by what Mr. Hughes calls the formula, consisting of a brass frame, furnished with vertical and horizontal bars.

Mr. Taylor exhibited two Fire Escapes; and Mr. Higgs explained his improved Monochord, in which measurement has been applied to sound, and the actual relation of one tone to another is shown on a scale of two feet.

REVIEWS.

The Companion to the Almanac, 1844.

THE COMPANION is always a welcome visitor, affording, as it does, a retrospective review of what has been done in the past year. It contains an able paper "On Arithmetical Computation," by Mr. D. Morgan; the progress of railways in England, an epitome of the railways in America; a chapter on pavements of towns, in which a able notice is taken of most of the wood pavements, and other mode of paving; an abstract of all the principal Acts of Parliament passe last Session, and its usual report on "Public Improvements," which, account of its critical acumen, is especially entitled to the notice architects; it has some appropriate remarks on the façade of British Museum, which has already occupied our pages—also, noti of the buildings, in Lothbury—the Doric Screen of the Marqui Westminster's, Grosvenor Street; engravings of the Taylor and A dolph Institution, at Oxford, by Mr. Cockerell, with an engra the Proprietary College at Cheltenham; Lincoln's Inn Hall Library, in the style of Hampton Court Palace, by Mr. Hardwick the Joint Railway Terminus, in the Italian style, at London Bridg that portion which has been erected,—a view of the whole appe in last month's *Journal*, and the Corn Exchange at Glasgow. Besi what we have already enumerated,—the '*Companion*' contains a gre mass of valuable statistical information.

Ancient and Modern Architecture. By M. JULES GAILHABAUD. Series the First. London: Firmin Didot & Co..

THE first series of these interesting sketches of ancient and modern monuments, is now complete, comprising an extensive range of studies. The number of plates is forty, and containing a great number of details, they afford a good synopsis of the graphic history of architecture. The Hindoo, the Egyptian, and the Persian, are well illustrated. So are the Pelasgic and Celtic styles, but as these latter are rather subjects of archæological than professional interest, we could well have compounded for a more restricted treatment, as compared with Greek art. The only monument of Greece at present, is the Temple of Segesta; the deficiency, we hope, will be made, as promised, in the subsequent series. Indeed we see that the Parthenon has been already published. The Roman and early Italian styles afford several illustrations, as does the Byzantine. The Arabian style has its representative in the Mosque of Ibn Tulun, at Cairo; neither have the medieval monuments been neglected.

The text has been confided to the hands of Messrs. Gailhabaud, Albert Lenoir, Raoul Rochette, Jomard, Langlois, Leon Vaudoyer, Dr. Franz Kugler, and others, names which are guaranteed for the artistic and antiquarian treatment of the subject.

In the subsequent series we are promised an extended treatment of the various styles, but we think it hardly necessary to go to the extent, with regard to modern works, of republishing St. Paul's Cathedral, the Docks, and other edifices, &c., well known, and so often described. Still, perhaps some sacrifices must be made to the public, and when we consider that it is only by a very large sale, that a work so cheap as the present can be made to remunerate, we must not complain, if the professions do not have it all their own way. Undoubtedly the present work forms one of the cheapest and most available works of reference yet afforded to the student and the profession.

Lithographic View of Cottages and School in the Village of Bourton Berks, erected on the property of HENRY TUCKER, ESQ., *by* FRED. W ORDISH, *Architect.*

IN these buildings, a praiseworthy endeavour has been made to revive in the ordinary labourers cottages and village schools, that character which is so perfectly and alone in harmony with our English country, an humble endeavour to re-diffuse a few sparks of that spirit of the bygone, which has lain asleep so long, and in the delightful anticipation, that the time for the erection of bastard incongruous heathen soulless buildings, has had its day, and that now is the redawning of better and nobler desires, of delight to spread far and wide, buildings suited to the recluse and the wordling, of which few, though very beautiful specimens, remain in ruins.

Each cottage is provided with a lobby, living room, open stairs, kitchen pantry, with two bed-rooms and closets to each, above; the whole, throughout, is in good keeping; the three single lights to the living room, are fixed in deep arched recesses, with pointed arches sufficiently spacious to accommodate a person reading, in the end recess of each habitation, the ancient custom of chaining the Scriptures, will be conformed to.

The schools are sufficiently spacious to accommodate the whole of the children of the village, and are well ventilated, being 21 feet high. The roof has all its timbers framed, boarded, and exposed, springing from stone corbels, on which are cut the initials of the several benefactors, the floors are also of stone; the windows, ground glass; opposite, are recesses for books. The end window contains the armorial bearings of the family at whose expense this portion has been erected, in the gable thereof, and the gloom of the timber, is formed an antique cross of stained glass; the school is also provided with lobby, cloak room, and masters' house complete, over the centre of the latter, is the inscription, *Æ.* X. 1842., in the scroll work over the stone fireplace, is another, embodying the object of the donors.

These buildings are to be opened in July next, for public use, and are erected in the village of Bourton, near Shrivenham, Berks, in the parish of the Archdeacon Berens, at the expense of the family of "Tuckers" formerly inhabitants. The cottages are the sole property of Henry Tucker, Esq., the total expense of the whole, exclusive of the gift of the rough stonework, only cost 750*l.*

Mr. Weale recently visited Holland for the purpose of obtaining the original and only set of drawings of the extraordinary collection of painted glass in Gouda, in Holland, which he has succeeded in purchasing and bringing to England.

PARSON'S PATENT.

SIR—In No. 74 of your *Journal* (November, 1843) you furnish extracts from the specification of a patent granted to P. M. Parson, of Waterloo Bridge Road, Surrey, for "certain improvements in steam engines and boilers, and in motive machinery connected therewith," &c.

At the bottom of the second column, page 396, you say, "The third claim in this branch is, we believe, perfectly new, whether useful or not, remains to be proved; we allude to the double-acting air pump with separate valves and offices, the one at bottom to remove the condensed water, that at the top to pump away the air and uncondensed vapour accumulating in the condensers," &c.

The date of Mr. Parson's patent being 8th December, 1842, I beg leave to refer you to a patent granted to John George Bodmer, of Manchester, dated 10th June, 1841, and entitled for "certain improvements in machinery for propelling vessels in water, part of which improvements apply also to steam engines to be employed on land." There, with reference to Sheet III. of drawings, Figs. 2 & 7, you will find described a double-acting air pump, the object of which is to remove the condensed water at the bottom, and to pump away the air and uncondensed vapour at the top.

Whether or not such an air pump would tend to produce a more perfect vacuum, I do not at present pretend to determine; but I should think it would materially influence the speed at which an engine may be worked.

At all events there has been one of Mr. Bodmer's double piston steam engines (of 30 horse power) whose air pump is constructed upon the principle in question, working in this town for the last two years; its crank shaft makes from 70 to 80 revolutions per minute, the steam being used at 30 lb. pressure in the boiler and expanded; and I doubt whether a common air pump would bear such a speed.

I am, Sir,

Manchester, Your obedient servant,
Dec. 7, 1843. R. B.

OBITUARY.

JOHN CLAUDIUS LOUDON.

AFTER several months of impaired health, and latterly a rapid decline arising from a pulmonary disorder, this gentleman died at his house, Porchester Terrace, Bayswater, on the 14th of December, leaving a name that is a very conspicuous one in the necrology of the year 1843, and which will thence be transferred to the more permanent record of biography. Many and varied are his claims to honourable mention by the last, since, high as he stood in his more immediate profession as a landscape gardener, and as a botanist and horticulturist, he extended his studies to other pursuits, and with more than ordinary diligence and success; nor must it be supposed, from this diversity of attainments, that his knowledge in some of them was but slight and superficial. Such was most assuredly not the case with regard to his architectural studies, and it is with reference to them that he is more especially entitled here to notice from ourselves.

To him we are indebted for the very first periodical expressly devoted to our art, viz. the "Architectural Magazine," which was commenced by him in 1834, and carried on till the end of 1838, when he discontinued it, although very reluctantly, and not so much from want of encouragement, it being then established in character, as because it occupied time which he could ill spare from other engagements, among which was the editorship of the *Gardener's Magazine;* and to conduct two periodical works, both of them monthly ones, simultaneously, is a task almost too great for the most indefatigable. Previously to the appearance of the *Architectural Magazine*, there was no one known and fixed point of rendezvous to which professional men or others could resort, whether for the purpose of seeking or communicating information We do not say that until then architecture had been entirely excluded from the periodical literature of the day; on the contrary, papers of the kind, some of them, of considerable merit and interest, had appeared in literary journals;[1] but only occasionally, and scattered through a range of different publications. Then, for the first time, did Architecture enter the ranks of journalism, certainly in this country, nor as far as we are aware, did there at that time exist any thing of the kind in other countries, although several foreign architectural journals have since arisen.

[1] We may here observe that it was in consequence of being struck by an article of the kind, that Mr. Loudon sought out and made acquaintance with its author—one who, by this time, must be tolerably familiar to our readers by the pseudonym of Candidus.

Of good omen in itself, as indicating the spread of architectural study and the increasing interest taken in it, Mr. Loudon's "Magazine" gave such study a favourable impulse, and that in the proper direction. Liberal and enlightened in his views, and perceiving the real interests both of the art and its professors, better than many of the latter seemed to do themselves, he sought to remove the prejudices which had operated as obstacles against a general intelligent appreciation of the former as an æsthetic or fine art. The more, we have heard him say, the public can be brought to understand, and to have a real taste for architecture, the better able they are to reason upon its productions, to enter into their particular merits, and to discriminate between beauties and defects, all the better will it be for architecture itself, and for those who practise it—not, indeed, for all alike individually, but as a class. People would then be disabused of their implicit respect for mere names, they would be better able to recognise talent, and better disposed to encourage it. A taste for architecture should be cultivated by all persons of liberal education, for the sake of the interest and enjoyment it affords; and the wider such taste spreads itself and becomes that of the many instead of being limited to the very few, all the better must it prove for the art, for public apathy and indifference towards it arises mainly from ignorance of it on the part of the public; and the shallow criticism and one-sided views of it which now pass current with the mass, will no longer impose upon their judgment.

Subsequent experience has confirmed the correctness of these views, if not in the fullest extent, as far as could be expected within so short a period. And to them we may add, that one very great advantage, although not the main and professed one, attending a journal of such nature, is that attention is kept alive to the subjects treated of by it; our ideas are not allowed to remain stagnant; opportunity is afforded for discussion, and for testing the soundness of opinions that have been indolently adopted as matter of course, and allowed to pass current as incontrovertible merely because they have not been controverted, but uniformly looked at from the same one-sided point of view. Another advantage and that not the least of all, is that through the medium of a periodical, valuable matter is frequently elicited from those who, but for the facility of communicating it so afforded, would never have thought of communicating it at all; in fact, could hardly have brought it before the public in any other shape, it being too little in mere bulk for the substance of a separate volume, while in the shape of a pamphlet it would appear only to pass unnoticed. It may, indeed, occasionally happen that a similar opportunity is afforded a writer, in a literary journal; but then it is very rarely, and only under particular circumstances; those which admit articles of the kind at all, are not open to mere casual correspondents; nay, some of them are so utterly inaccessible, and their editors so thoroughly impracticable, that for any one who is not actually of their own corps and coterie to offer any thing in such *quarters*, is to incur the most insolent treatment.[2]

But we are now digressing too widely, although what we have been saying shows the essential service which Mr. Loudon rendered architectural study by starting his "Magazine," more especially as he conducted it on liberal principles, allowing all opinions to have a fair hearing, aware that the soundest are likeliest to prevail in the end, and are rather confirmed than weakened by having first to encounter established prejudices and fallacies.

In the way of personal memoir, little can be expected so very recently after his decease beyond a few facts and dates; for the authenticity of which we can vouch; yet even that little will make evident that should adequate materials for the purpose be in existence, the earlier part of Mr. Loudon's life would form an interesting and instructive narrative.

John Claudius Loudon was born in Lanarkshire, April 8th, 1782, but very soon afterwards the family removed into the neighbourhood of Edinburgh, where his father carried on a respectable farm. The son, however, chose for himself a different pursuit, one, indeed, not wholly out of the same direction, but more congenial to an imaginative mind,—that, namely, of Landscape-gardening, in which nature is contemplated with somewhat more poetic eyes than those of an agriculturist. He was accordingly brought up with a view to his following such profession; and first commenced it on his own account in 1803, when he came to England furnished with letters of introduction to several of the first landed-proprietors in the country. Yet although he continued till nearly a twelvemonth before his death to give professional advice in laying out grounds and gardens—those of the new cemetery at Cambridge, were, we believe, the last for which he was consulted—he did not make landscape gardening his exclusive practice for any great length of time, for about 1809 he took a large farm in Oxfordshire, which seems to have been a not unprofitable concern, nor was it incompatible with professional engagements at different '*places*.' Not quite so compatible with farming pursuits was his desire to visit other countries and behold their scenery, which led him to travel through the North of Europe in the memorable years 1813, 1814, and 1815, which he spent in Sweden, Russia, and Poland. He did not, however, publish any account of that residence abroad, although from his protracted stay and his own habits of intelligent and close observation, he would, no doubt have been able to communicate a mass of interesting information, and far more trustworthy than that afforded by the herd of modern tourists. The remark also applies to his travels through Italy, in 1819, and through France and Germany in 1828. These different visits to the Continent probably form no small portion of the seventeen volumes of Journals, which, we understand he has left; yet whether they are recorded sufficiently in detail for any gleanings from them to be given to the public, may be questioned.

Most assuredly it was not aversion to literary labour which deterred him from writing a narrative of his travels abroad, rather, perhaps, was he hindered from so doing by the magnitude of other works he had undertaken, for immediately after returning from his tour, he set about compiling his "*Encyclopædia of Gardening*," and subsequently another elaborate work, the "*Encyclopædia of Agriculture*," both containing an immense mass of information; and whilst so employed he had an attack of rheumatism which ultimately led to the most disastrous consequence. Being advised to try the effect of shampooing, he went the following year to Brighton, and submitted to that process in Mahomet's Baths; when, in the operation, his right arm was broken near the shoulder, nor did it afterwards properly unite. He nevertheless continued to use his right hand for writing till 1825, when, by another accident, the same arm was again broken in two places, and he was obliged to have it amputated; nor was this the full extent of the calamity, for he was also obliged to lose two fingers of his only remaining hand. Even in this crippled state, the energy of his mind overcame all obstacles, nay he would seem to have been impelled by it to undertake still more laborious tasks, and to engage in more than a single one at a time. Among those of the last ten years of his life were his "*Encyclopædia of Cottage and Villa Architecture*," "*Suburban Gardener*," "*Arboretum Britannicum*," and a popular edition of all "Repton's works on Landscape Gardening," in a closely printed octavo volume, intended to be the first of a series of similar reprints of other authors on the same subjects, besides the "*Architectural Magazine*," and the "*Gardener's Magazine*," which last, he carried on till his death. All of them may be said to have been successful: the "Encyclopædia of Villa Architecture," has already gone through two if not more editions,—yet owing to the immense outlay attending it—not less than *fifteen thousand* pounds—the "Arboretum," was so far from being a profitable concern that it has not yet paid its expenses by about £2500 which yet remains to be cleared off: and this and more than this, it is to be hoped, will be accomplished within a short time, now that the circumstances of the case are known, for the benefit of his widow and daughter. A work of that kind well merited the patronage of Government, and would no doubt have obtained such patronage in any country where literature and science are at all encouraged by the state.

DAVID HAMILTON, ARCHITECT.

"Our obituary," says the *Glasgow Citizen*, "contains the name of Mr. Hamilton, the eminent architect. About two years ago he had an attack of paralysis, from which he never thoroughly recovered; and for some time past he had been in a declining state of health. His death took place at two o'clock on the morning of Tuesday, 5th Dec. last, to the deep regret of his numerous friends. He was in the 76th year of his age, being born in Glasgow, on 11th May, 1768.

Mr. Hamilton's professional abilities were of the first order; and in private life he was distinguished for the singular amiability of his character, the unaffected modesty of his disposition, the vivacity of his conversation, enlivened as it often was with anecdotes of the olden time, and for his genuine worth of heart, disinterestedness, and nice sense of honour. With the national sin of "mammon worship," he was in no way tainted. Had he cared more for money he must have died rich. His professional charges were considerably below what his distinguished merits entitled him to claim, and his purse was always open to assist the needy and unfortunate. It is doubtful whether he has left an enemy behind him, or whether indeed he ever had one. Certainly, few men had more attached friends or were more warm in their friendships. By his professional brethren he was much esteemed: and jealousy or unworthy rivalry had, it is believed, no place in their intercourse. He has

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[2] We know of one tolerably strong instance of the kind on the part of the editor of the *Quarterly Review*, who detained a MS upwards of two years and a half, although the party offering it had desired that it might be returned at once if not approved, or if retained for further consideration, to be informed to that effect, yet notwithstanding repeated applications in the interval, no tidings could be gained of it, not even a single line, either from the editor or any one in Mr. Murray's establishment; and in this suspense he might have continued as many years longer, had not the intervention of a friend personally known to Lockhart obtained the restoration of his MS, accompanied, not with any explanation as to the reasons for its being rejected, or with any adequate apology, but with merely the trumpery and evidently shamming excuse that it had been "laid by and forgotten"! After the numerous *remembrances* he had had in the interim, such an excuse was little short of a direct insult.

passed from the scene of his earthly labours; but he has bequeathed to all who knew him the memory of a good example—he survives in the affections of his friends—and the numerous splendid works he has left behind, may be regarded as so many monuments commemorative of his genius.

The number of elegant or splendid structures designed by Mr. Hamilton, particularly in the west of Scotland, is very great. Independently of Hamilton Palace, the princely seat of the Duke of Hamilton, which is enough of itself to stamp his reputation as a great architect, he produced the splendid Royal Exchange of Glasgow; the Western Club-house; the British Linen, the Glasgow and Ship, and other magnificent banks; Toward Castle, the seat of the late Kirkman Finlay, Esq.; Dunlop House, Ayrshire, the seat of Sir John Dunlop, Bart.; the elegant structure of Lennox Castle, the residence of John Kincaid, Esq. of Kincaid, so much admired by all professional men: and numerous other buildings, remarkable for their taste and effect. Mr. Hamilton was also a competitor for the New Houses of Parliament; and although his design was not adopted, it was so highly esteemed by the Government that it was rewarded with a prize of 500*l*. In this competition he was the only Scotch architect who was successful, although several of them sent in two or three different sets of plans, while he submitted only one. In July, 1840, Mr. Hamilton was entertained at a public dinner in this city, when he was presented with an elegant service of plate, together with a considerable sum of money enclosed in a gold box, a distinguishing proof of the estimation in which he was held by his fellow-citizens. Mr. Hamilton is succeeded in business by his son, who possesses, we believe, much of his father's fine architectural taste and talents.

NEW CHURCH, BROADWAY, WESTMINSTER.

This church, designed by Mr. Poynter, was consecrated on 14th December, by the Bishop of London. This edifice is the first of the recent Gothic churches erected in the Metropolis, which is built with stone. The exterior is faced with Kentish rag, with Bath stone quoins, windows and dressings, and the whole of the arches and of the moulded and carved work within side is also of Bath stone. Another peculiarity is the undisguised adaptations of cast iron columns to the style of architecture, which is that of the latter part of the 13th century. The early tracery of the east and west windows is of a highly ornamental character. The chancel is raised by six steps above the body of the church, and forms an apsis, the ceiling and walls of which are richly decorated in colours. There is also some very fine stained glass, and the font is one of the most elaborate specimens of carving that has of late been executed. The general effect of the building, both externally and internally, is strikingly ecclesiastical, and exhibit the skill of the architect in adapting the materials to produce the greatest effect without too large an expenditure in labour. As the neighbourhood in which this church is situate will shortly undergo a very beneficial alteration, in pursuance of the contemplated improvements in the property of the Dean and Chapter of Westminster, it has been designed with a spire, which will place it among the most important of modern ecclesiastical edifices. The proposed height is 200 feet, but it has as yet advanced little beyond a fourth of that elevation for want of funds. It is to be hoped that those who are disposed to encourage ecclesiastical architecture, will not suffer the work to languish from this cause.

LIST OF NEW PATENTS.

(From Messrs. Robertson's List.)

GRANTED IN ENGLAND FROM NOVEMBER 24 TO DECEMBER 28, 1843.

Six Months allowed for Enrolment, unless otherwise expressed.

James Connell, of Dublin, gent., for "*improvements in the manufacture of candles and candlewicks.*"—Sealed November 24.

Richard Garrett, of Leiston Works, Suffolk, agricultural implement maker, for "*improvements in machinery, for drilling thrashing, and cutting agricultural produce.*"—Nov. 25.

John Frith, of Sheffield, architect, for "*improvements in the manufacture of cannon.*"—Nov. 25.

William Irving, of Regent-street, Lambeth, engineer, for "*improved machinery and apparatus for cutting and carving substances to be applied for inlaying and other purposes.*—Nov. 25.

Edward Tann the elder, Edward Tann the younger, and John Tann, of Minerva Terrace, Hackney-road, iron-safe manufacturers, for "*improvements in locks and latches, and in iron rooms, doors, safes, chests, and other repositories.*"—Nov. 25.

Alexander Vivian, of Gwennap, Cornwall, gent., for "*an improved apparatus for dressing ores.*"—Nov. 25.

Joseph Rock, jun., of Birmingham, factor, for "*improvements in locks and latches.*—Nov. 25.

George Edmund Donnisthorpe, of Bradford, York, top manufacturer, "for "*improvements in combing wool and other fibrous substances.*"—Nov. 25.

William John Hay, of Portsmouth, operative chemist, for "*improvements in producing light by percussion, for signals and other purposes.*—Nov. 25.

Thomas Drayton, of Brighton, gent. "*improvements in coating glass with silver for looking glasses, and other uses.*"—Nov. 25.

John Richard Lund, of Cornhill, chronometer-maker, for "*improvements in the construction of compensation balances of chronometers.*—Nov. 25.

James Cooper, of St. John-street, Clerkenwell, provision merchant, for "*vessels of peculiar construction, and an apparatus for the purpose of preserving various articles of provision for the use of families.*—December, 5.

John Hicks, of Bolton-le-Moors, Lancaster, engineer, for "*improvements in steam-engines, and in apparatus to be connected therewith, for driving machinery, part of which improvements are applicable to forcing, lifting, and measuring water.*—Dec. 5.

Joseph Robinson, of Old Jewry, solicitor, for "*improvements in the construction and mode of working engines by the agency of air or gases for obtaining or producing motive power.* (A communication.) Dec. 5.

William Wardrope, of Welbeck-street, surgeon, for "*improvements in the forms, or construction of hooks and eyes for fastening dresses, and for other uses.*" Dec. 5.

William Newton, of Chancery-lane, engineer, for "*improvements in extracting certain metals from ores and other compounds of these metals, some part, or parts of which improvements are also applicable to obtaining another product, or other products from such ores or compounds.* (A communication).—Dec. 5.

Lawrence Holker Potts, of Greenwich, doctor of medicine, for "*improvements in the construction of piers, embankments, breakwaters, and other similar structures.*—Dec. 5.

John Reed Hill, of Chancery-lane, civil engineer, for "*improvements in a press or presses, machine or machines, for letter-press printing.*—Dec. 8.

William Brockedon, of Devonshire-street, Queen-square, gent., for "*improvements in the manufacture of pills and medicated lozenges, and in preparing or treating black lead* —Dec. 8.

Joseph Lamb, of Manchester, spindle and fly manufacturer, for an "*improvement or improvements in machinery used for preparing and spinning cotton, wool, flax, silk, and similar fibrous materials.*—Dec. 8

John Bishop, Poland-street, Westminster, jeweller, for "*improvements in paving roads, streets, and other places.*—Dec. 8.

Christopher Nickels, of York-road, Lambeth, gent., for "*improved [illegible] apparatus for facilitating the cutting, or shaping of materials for making [illegible] and other articles.*—Dec. 8.

William Baddeley, of Lombard-street, for "*improvements in rotary engines.* (A communication.)—Dec. 8.

Julius Schottlaender, of St. Swithin's-lane, merchant, for "*improvements in the deposition of metals upon various felted and other fabrics.*—Dec. 8.

Alexander Southwood Stocker, of Birmingham, wine merchant, for "*improvements in the manufacture of glass and other vessels, whereby the corks for the same are easily applied, and more effectually retained in their situations; where effervescing liquids are used; also in the manufacture of articles, and the application of the same to that part of the vessel in which his improvements consist, so as to secure the cork; also an apparatus for extracting such corks when required to be released.*—Dec. 8.

Henry Vingoe, and William Henry Vingoe, of the town of Penzance Cornwall, builders, for "*improvements in apparatus for planting or setting, drilling or dibbling corn, grain, seed, pulse, ormanure, parts of which improvements are also applicable to the construction of wheels and carriages.*—Dec. 8.

Alfred Vincent Newton, of Chancery-lane, mechanical draftsman, for "*improvements in the manufacture of cyanogen, and its compounds, particularly the prussiates of potash and soda.*—(A communication.)—Dec. 13.

John Sylvester, of Great Russell-street, engineer, for "*improvements in applying heat to brine, or other matters contained in vessels.*—Dec. 13.

Henry Purser Vaile, of Blackfriars-road, gent., for "*improvements in manufacturing metal combined with other matters, for the covering of floors and other surfaces.*—Dec. 13.

Robert Kirby, of Cambridge-terrace, Hyde Park, Esq. for "*improvements in materials for, and in the modes of applying coverings to coffins for the dead.* Dec. 13.

William Young, of Queen-street, Cheapside, lamp-maker, for "*improvements in the the manufacture of lamps and gas burners.*—Dec. 13.

Samuel Parlby, of Rutland Gate, Knightsbridge, retired major, for "*improvements in the construction of wheels for carriages.*—Dec. 18.

Benjamin Cook, jun., of Birmingham, merchant, for "*improvements in coating or covering the surfaces of metals of various forms, and of applying the same to a variety of useful purposes.*—Dec. 18.

Francis L'Estrange, of Dawson-street Dublin, surgeon, for "*improvements in hernial trusses, to prevent the descent of hernia through the internal as well as the external ring.*—Dec. 21.

Pierre Frederick Ingold, of Dean-street, Soho, watchmaker, for "*improvements in machinery for making parts of watches and other time keepers, as well as parts of instruments for mathematical, optical, astronomical, nautical and musical purposes* —Dec. 21.

Thomas Murray Gladstone, of New Swan Garden Iron Works, Wolverhampton, for "*improvements in machines for cutting or shearing iron or other metals.*—Dec. 28.

Richard Archibald Brooman, of the Patent Office, 166, Fleet-street, London, gent., for "*improvements in figure weaving machinery.*" (A communication.)—Dec. 28.

END OF VOLUME VI.